Natural Environment Research Council

ARASF

Atmospheric Research Airborne Support Facility

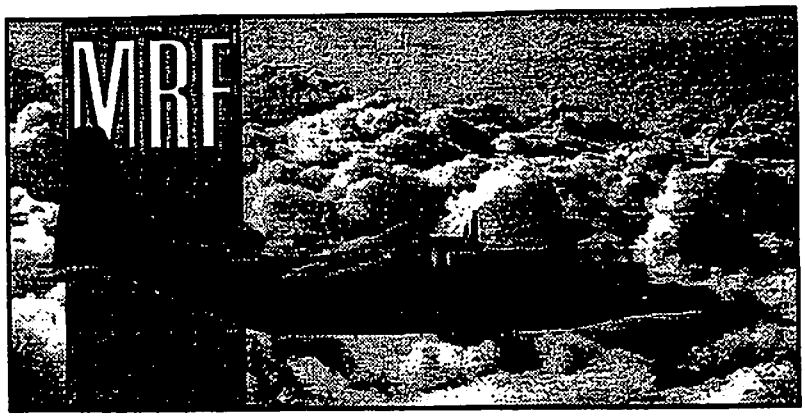
Flight Data Catalogue

Flight A531

2 April 1997

OXICOA

FLIGHT FOLDER



Flight No. A 531

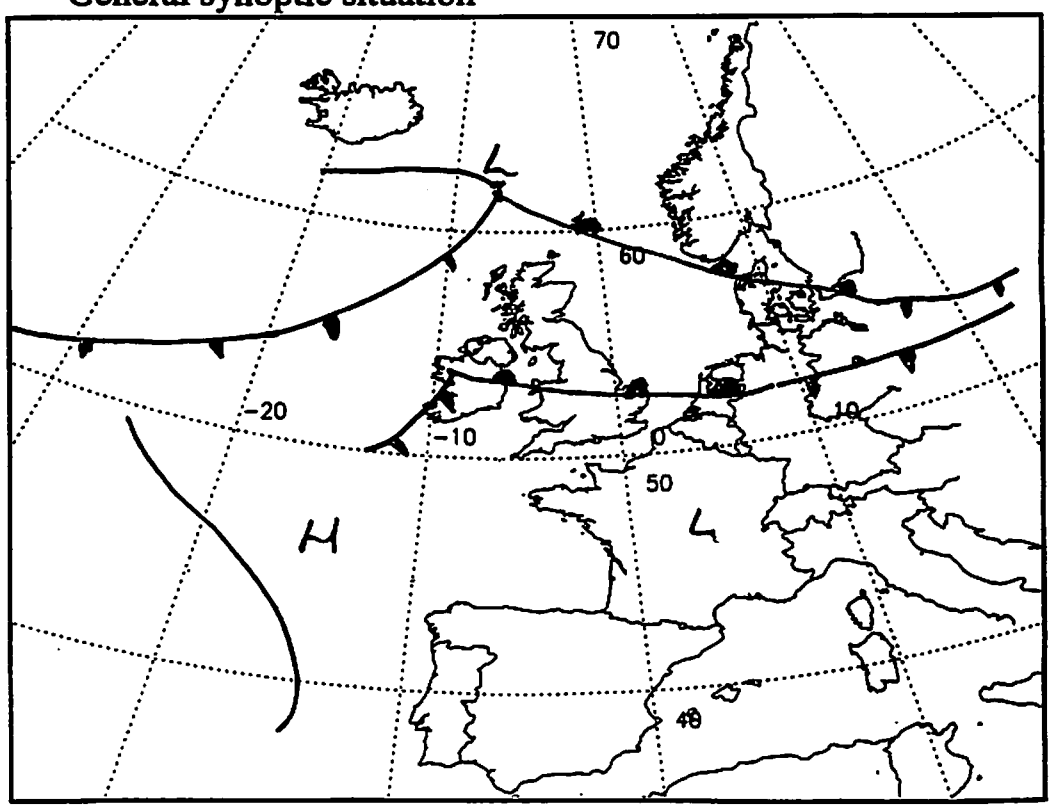
DATE: 02/04/97

Take off : 1255 Z
Landing : 1555 Z

Aircraft Scientist	: A HAYE	Captain	: SQN LDR C O'BRIEN
Flight Leader	: D PERCIVAL	Co-pilot	: FLT LT M PURSE
Others	: H RICHER	Navigator	: FLT LT J CANNING
	K DEWEY	Engineer	: MENG N NEWTON
	J HENT	Loadmaster	: MENG K QUICK
	D TIDDEMAN		
	B BANDY		
	S BAUGUITTE		
	T GREEN		
	C MILLS		

Trials Instructions ACSOE :
Operating area : SOUTH WEST / SCILLYS.

General synoptic situation



TIME : 12

2/4/97

Sortie Brief: ACSOE - Azores Instrument Test Flight

SF26: Stephane Bauguitte

Sortie Objective: To test all chemical instrumentation.

Operational Area: To be chosen by air crew.

Weather conditions: Avoid areas of cloud and precipitation.

Flight Pattern:

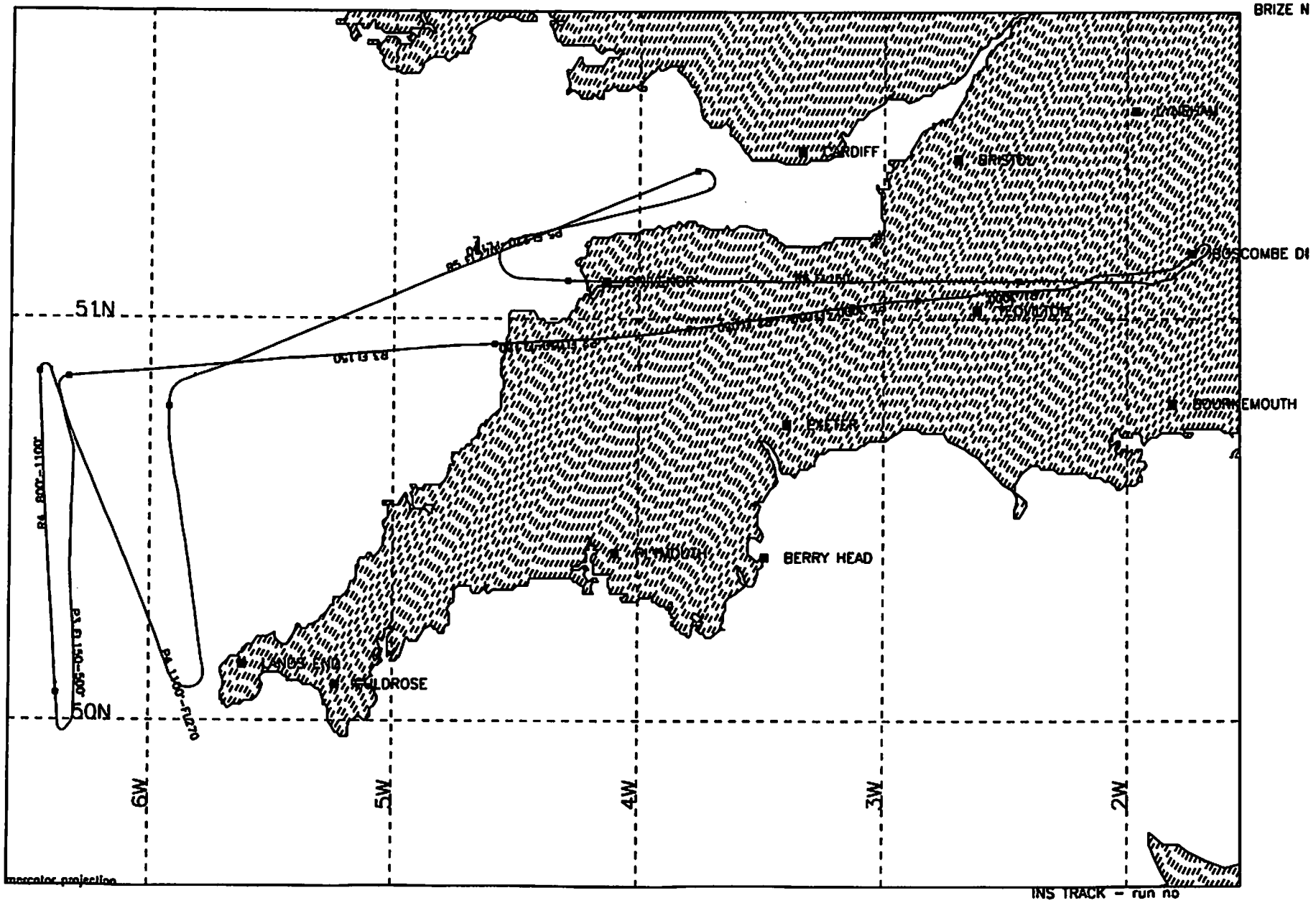
1. Depart Boscombe Down (12:00 local) maintaining altitude at 3000ft until wet chemistry instruments are checked.
2. Profile ascent to 5000ft maintain horizontal run until wet chemistry instruments are checked.
3. Continue profile ascent to FL150 and maintain horizontal run for 20 minutes.
4. Transit and descend into operational area (if time allows).
5. Fifteen minutes in boundary layer for instrument calibration (if time allows).
6. Ascend to maximum safe altitude, maintain for 15 minutes.
7. Descend to FL150 maintain horizontal run for 15 minutes.
8. Descend into Boscombe Down, arriving at 16:00 local.

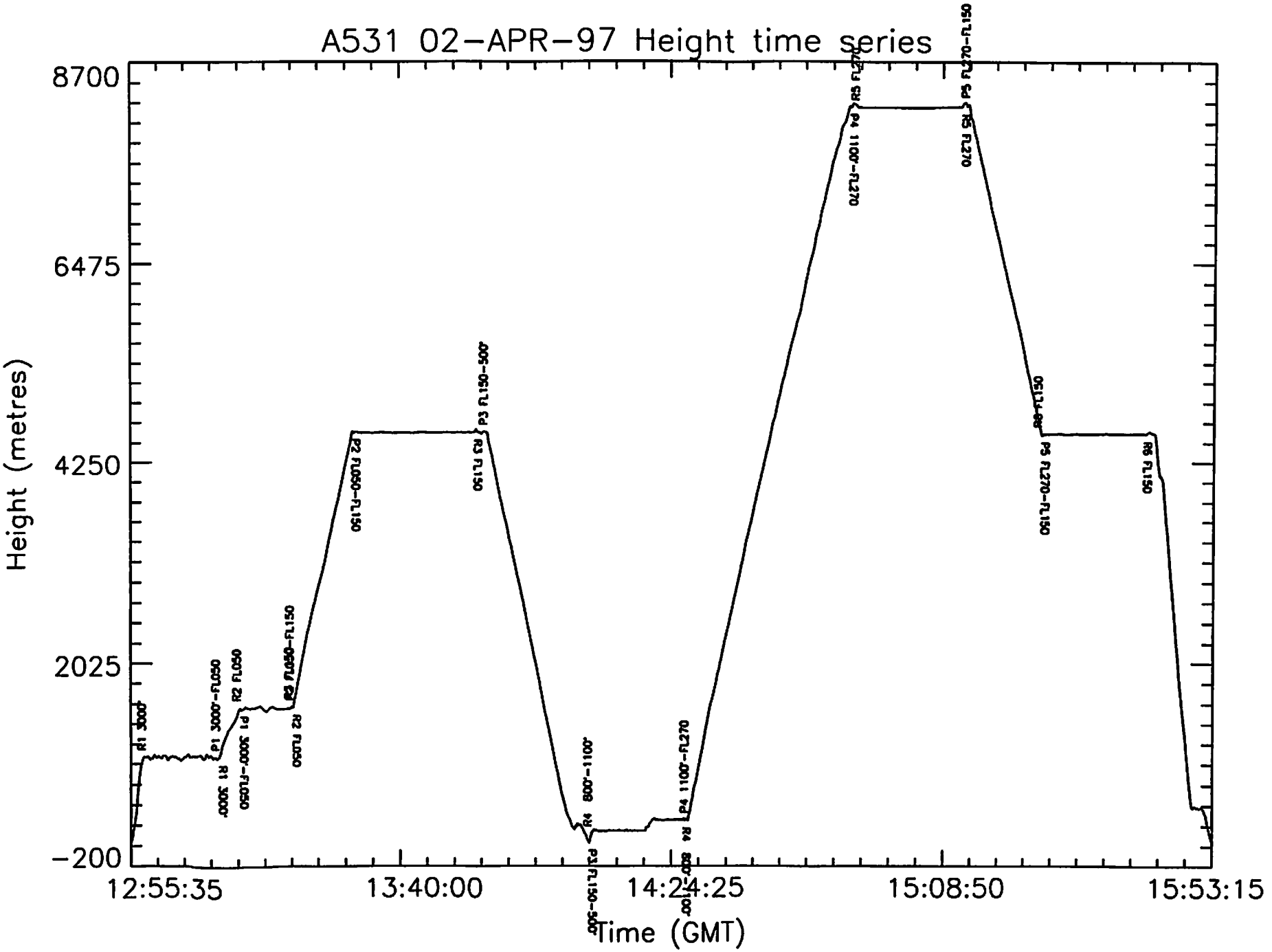
Other requirements:

Constant pressurisation on horizontal runs.

Profiles to be carried out at 1000 ft/minute above the boundary layer, 500 ft/minute below the boundary layer.

A531 02-APR-97 12:55:35-15:53:15GMT




A531 02-APR-97 Height time series
8700
6475
4250
2025
-200
Height (metres)
12:55:35
13:40:00
14:24:25
15:08:50
15:53:15
Time (GMT)
R1 3000'
P1 3000'-FL050
R1 3000'
P1 3000'-FL050
R2 FL050
R2 FL050
P2 FL050-FL150
R3 FL150-500'
P3 FL150-500'
R3 FL150
R4 800'-1100'
P4 1100'-FL270
R4 1100'-FL270
P5 FL270-FL150
P5 FL270
R5 FL270
P6 FL150
R6 FL150

AIRCRAFT FLYING PROGRAMME

DATE 2 April 1997 FLIGHT NO A531

FTI MRF01 ACSOE- Azores shake-down

Aircraft scientist	H Richer / A Kaye
Flight leader	D Percival
Cloud physics	~~M Pickering~~
Chemistry	K Dewey / J Kent / D Tiddeman / B Bandy / S Bauguitte / T Green / G Mills
Pre-flight clearance	D Findley / D Arthur dep 0800 + S HEATH
FTOs Depart F'boro	0900

Briefing 1000 Take off 1200 Return 1600

Press RETURN for next display (H for help) NEXT DAY 1-APR-1997 10:15

AIRCRAFT SCIENTIST'S LOG

Project: DYCOATEST Date: 2/4/14

Aircraft Scientist: A. Kaye

Flight No: A531 Page 1 of 3

GMT	Event Mark	Run No.	Height	Pres/Rad	INS Heading	Omega Pos'n Latitude / Longitude	Other Info. (eg. clouds, weather, visibility, winds, sea state etc.)	Photo No.
13:02:33		Flow 1	3000	P	266	51.07 / -2.29	10 minute delay because of flow problems. Very hazy ahead Some cu ahead in haze.	
13:09							into heavy cloud Cu & hazy below.	
13:10:09		R1 P1	3000	P	266	51.05 / -2.08	climb to FL150 4200 /13:12 out of cloud. Sc below Clear above.	
13:13:45	07	P1 e	FL150 5000	P	266	51.04 / -3.16	clear above sc below.	
13:22:38	08	R2/P2	950	FL	266	50.99 / -3.77	clear above 7/8 Sc below	
13:28:57		P2	117	FL	266	50.95 / -4.33	Clear above & below but 8/8 Sc ahead.	
13:32:19	09	P2/R3	150	FL	265	50.94 / -4.61	Clear above 8/8 Sc below. 13:34:20 Press"	
13:52:16	10	R3/	150	FL		50.86 / -6.38	clear above 8/8 Sc below.	
13:54:21	11	P3	150	FL	170	50.76 / -6.53	↓Some banding. 7/8 Sc below Some gaps to SBERD. clear above. 50.81 6 W line.	1018
14:05		P3	4000	P	184	50.17 / -6.31	8/8 Sc below Scilly Isles visible ahead in gap in cloud.	
							500 ft/min @ 1500 ft	
14:08:39							interrupt to get clear of land @ 800 ft.	

AIRCRAFT SCIENTIST'S LOG Project: ACSOE Date: 27/7/11

Aircraft Scientist: A. Kaye **Flight No:** A531

GMT	Event Mark	Run No.	Height	Pres/Rad	INS Heading	Omega Pos'n Latitude / Longitude	Other Info. (eg. clouds, weather, visibility, winds, sea state etc.)	Photo No.
14:10:03	15	P3	800	P	353	-50.06 / -6.40	Sc below 500 ft cloud tops.	
14:11:24	17	R4	800	P	354	-50.13 / -6.46	Sc 7/8 below could not finish profile. because of low cloud	
							QNH 1020 & sea state 2	
							~~Slight~~ small climb to keep clear of cloud.	
14:25:23	18	R4	~~1100~~ 1100	P	3~~8~~	-50.90 / -6.46	Sc below clear above.	
14:27:14	19	P4	1100	P	166	-50.88 / -6.41	FL 20600/14:46:00 Peroxide channel lead. Continuing climb.	
14:47:36		P4	FL246		344	-50.45 / -5.89	Sc below, some banding visible clear above.	
14:53:34	20	P4/	F270		354	-50.81 / -5.95	4/8 Sc Below ~~Sg~~ clear above	
14:54:06	21	R5	FL270		69	-50.89 / -5.02		
15:11:56	22	R5e	FL270			-51.38 / -3.73	4/8 cu below Sc to SBRD clear above.	
15:13:11	23	P5	FL270		255	-51.33 / -3.78	large shelfs of sc ahead clear above.	
15:25:06	24	P5/R6	FL150		91	-51.13 / -4.27	~~Sc~~ 2/8 cu below Hazy, clear above.	

~~15:40~~ 15:50

AIRCRAFT SCIENTIST'S LOG

Project: ACSOE Date: 2/4/97

Aircraft Scientist: A. Kaye Flight No: A531

GMT	Event Mark	Run No.	Height	Pres/Rad	INS Heading	Omega Pos'n Latitude / Longitude	Other Info. (eg. clouds, weather, visibility, winds, sea state etc.)	Photo No.
15:39:00		~~R5~~	FL150		91	51.11 / -2.72	1/8 Sc Cu in streaks hazy & clear above.	
15:41:47		R5e	FL150		88	51.11 / -2.40	1/8 Cu below hazy & clear above	
							——— end-of-science ———	

POST FLIGHT REQUIREMENTS FORM

Flight No: A531 Date: 040297 A/S Name: HAYE

Aircraft Scientist's Post Flight Requirements:

1. Are any copies of the flight folder required?
   YES ☑ NO ☐ for ..4.....

2. Flight data and folders will normally be discarded after 10 years, is this OK?
   YES ☑ NO ☐ If not OK, state period .....

3. Is the flight part of an international project or major campaign?
   YES ☑ NO ☐ Name of Project ..ACSOE.....

4. Do you want the video tape kept?
   YES ☑ NO ☐ How long? .....10 YRS.....

5. Has the Handheld camera or the Camcorder been used:
   YES ☐ NO ☑
   If yes, do you want the handheld camera film processed:
   immediately ☐ or when the film is finished? ☐

6. Do you want the cloud physics data kept?
   YES ☐ NO ☑
   If yes, which disc / file do you want it stored in?.....

7. Do you want to do the interactive processing?
   YES ☐ NO ☑

NOTE:

- Members of MRF Radiation and Cloud Physics groups are expected to meet their own requirements for data storage and non-standard processing.
- For non MRF users, Data Management Section will keep the processed data TEMPORARILY until the requirements are made known.
- Any other requirements for post-flight processing and data storage should be discussed with the Data Management Section.
- If copies of the Flight Folder are required, it is the responsibility of the Aircraft Scientist / User to produce them.

Interactive Processing Log

Flight No. A531 **Date:** 0204 97 **User:** KATE
Interactive by: D PERCIVAL
Date: 03 04 97

Renav

Kalman Filtering Used.

TWC

Profile plotted :
Line chosen : **Profile / Whole flight / Other**

a = −
b = +
c = + Not Fitted.

LWC

NO PMS DATA AS NOT FITTED

OK.

Heimann / Barnes

Flight Leader's Pre/In-Flight Check List

Flight No: A531 Date: 020497 Page 1 of 3

CHEK for auto selection

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
1021	REF +	5	0567	✓		Approx 0568
	REF -	7	2856	✓		Approx 2858
	AOSS	19	0087	F/S O/S	TORQUE 3.5	2047 st. and level
	AOA	18	2106	F/S O/S	TORQUE 3.0	2047 st. and level
	RD HT	37	0000	✓		As Indicated | 0000
	PR HT	8	3874	1010	1007	As Altimeter
	CABP	14	3249	NOISEY		
	A/S	9	0082	✓		As ASI | 0000 – 0100
	UP1S	81	1647	530	534	
~~1021~~	UP2S	82	1465	260	293	
1021	UIRS	83	0574	- 287	1558	
	UP1Z	84	152	✓		Approx 0147
	UP2Z	85	147	✓		Approx 0149
	UIRZ	86	584	x		Approx 2061
	UP1T	87	2444	19	16	As IAT
	UP2T	88	2439	19		As IAT
	UIRT	89	0000	133 ?		As IAT
	LP1S	91	235	32	33	
	LP2S	92	192	~~13~~ 13	~~15~~ 10	
	LIRS	93	0065	- 402	1558	
	LP1Z	94	151	✓		Approx 0150
	LP2Z	95	154	✓		Approx 0146
	LIRZ	96	66	✓		Approx 2050
	LP1T	97	2521	15		As IAT
	LP2T	98	2487	17		As IAT
	LIRT	99	0000			As IAT
	J/W	42	0997	✓		As Indicated | 0000
	HYGR	58	2728	8	8.1	
	HYCC	59	726	✓		696–901
	FDEW	138	1741	-10	9.5	DP = (DRSU/20)-100 C
	FSTA	139	0608			
	DTF	10	564	16	✓	
	DTC	11	6	8		
	NDTF	23	4095			same as De-Iced
	NDTC	24	7	?		
	INCT	48	2392			
	HEIM	141	2480			
	PRTC	142	2381	✓		approx 2380
	TWCD	70	4095			0000–4094
	TSAM	72	4095			0640–1860 | < *min*
	O3	100	139			
	O3P	106	2030	957		P≃ (*DRSU* × 0.4) + 145*mB*
	O3RG	113	1421			
1049						

Flight Leaders' Pre/In-Flight Check List

BCDS for auto selection

GMT	PARA.	NO.	H/D	D.R.S.	DECODE	INSTR	EXPECTED VALUE
1050	FL NO	1	Hex	0531	/		Flight No.
	GMTH	2	Hex	0105	105012	/	Clock: First 4 No.s
	GMTM	3	Hex	0012			Clock: Last 4 No.s
	E/M	4	Hex	2-73	/		Event Mark Counter
	INCH	49	Dec				Multipxd Hkeeping
3569 / 19	1500 / 3855	3568	511	3569	3704	3568	0136. /
	LATC	160	Dec	4094			Latitude
	LONC	161	Dec	4094.			Longitude
1053.							

Total Water Content Meter Check List

TOTW for auto selection Height:

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES	
						INFLIGHT	*PREFLIGHT*
	TWCD	70				0001–4095	
	TNOS	71				2000–3460	< *min*
	TSAM	72				0640–1860	< *min*
	TAMB	73				2400–3200	
	TSRC	74				2160–2470	
	HTR1	75				0000–4095	< 4095
	HTR2	76				0000–4095	< 4095
	ISRC	77				0001–1230	< *min*
	STAT	78				4095	
	EV1V	170					
	EV2V	171					
	NPWR	172					
	EV1C	173					
	EV2C	174					

BROAD BAND RADIOMETER FIT (pre-Flight only)

	PARA NO	POSITION	DOME	COVERS	OBSCURERS
UPPER	81,84,87 82,85,88 83,86,89	Port Stbd Centre	Clear Red Silicon	(Off) / On	Large/(Small)
LOWER	91,94,97 92,95,98 93,96,99	Port Stbd Centre	Clear Red Silicon	(Off) / On	

Flight Leaders' ~~Pre~~/In-Flight Check List

BCDS for auto selection

GMT	PARA.	NO.	H/D	D.R.S.	DECODE	INSTR	EXPECTED VALUE
1346	FL NO	1	Hex	531	✓		Flight No.
	GMTH	2	Hex	0134			Clock: First 4 No.s
	GMTM	3	Hex	0634	✓		Clock: Last 4 No.s
	E/M	4	Hex	0009	✓		Event Mark Counter
	INCH	49	Dec				Multipxd Hkeeping
2421 -9.3	1292 3855	2430	1381	2430	3789 ✓	2431	0172 ✓
	LATC	160	Dec	0578	50.864°	N	Latitude
	LONC	161	Dec	4027	~~3579~~ -5°	624 W	Longitude
1349							

Total Water Content Meter Check List

TOTW for auto selection Height:

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES	
						INFLIGHT	*PREFLIGHT*
	TWCD	70				0001–4095	
	TNOS	71				2000–3460	< *min*
	TSAM	72				0640–1860	< *min*
	TAMB	73				2400–3200	
	TSRC	74				2160–2470	
	HTR1	75				0000–4095	< 4095
	HTR2	76				0000–4095	< 4095
	ISRC	77				0001–1230	< *min*
	STAT	78				4095	
	EV1V	170					
	EV2V	171					
	NPWR	172					
	EVIC	173					
	EV2C	174					

BROAD BAND RADIOMETER FIT (pre-Flight only)

	PARA NO	POSITION	DOME	COVERS	OBSCURERS
UPPER	81,84,87 82,85,88 83,86,89	Port Stbd Centre	Clear Red Silicon	Off / On	Large/Small
LOWER	91,94,97 92,95,98 93,96,99	Port Stbd Centre	Clear Red Silicon	Off / On	

Flight Leader's [redacted]/In-Flight Check List

Flight No: 4531 Date: 020497 Page 2 of 3

CHEK for auto selection

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
1306	REF +	5	0567	/		Approx 0568
	REF -	7	2856	/		Approx 2858
	AOSS	19	1482	F/S O/S	TORQUE	2047 st. and level
	AOA	18	1246	F/S O/S	TORQUE	2047 st. and level
	RD HT	37	2766	3300	3300 /	As Indicated | 0000
	PR HT	8	3474	3.3	3.2	As Altimeter
	CABP	14	3414	1030		
	A/S	9	1300	178	180 .	As ASI | 0000 – 0100
	UP1S	81	2033	672	693	
	UP2S	82	1736	318	341	
JN02	UIRS	83	0909	-220	1558	
	UP1Z	84	151	/		Approx 0147
	UP2Z	85	145	/		Approx 0149
JN02	UIRZ	86	0844			Approx 2061
	UP1T	87	2638	10	5.6	As IAT
	UP2T	88	2655	9		As IAT
1323	UIRT	89	0000			As IAT
	LP1S	91	0600	181	191	
	LP2S	92	0609	116	134	
JN02	LIRS	93	456	-320	1558	
	LP1Z	94	151	/		Approx 0150
	LP2Z	95	157	/		Approx 0146
JN02	LIRZ	96	311	/		Approx 2050
	LP1T	97	2804	3	-6.4	As IAT
	LP2T	98	2807	3	-7.4	As IAT
JN02	LIRT	99	0000			As IAT
	J/W	42	1152	0.1		As Indicated | 0000
	HYGR	58	1613	-27	-28	
	HYCC	59	821			696–901
	FDEW	138	1656	-17.2	-21	DP = (DRSU/20)-100 C
	FSTA	139	608			
	DTF	10	2586	-8		
	DTC	11	4			
	NDTF	23	4095			same as De-Iced
	NDTC	24	0007			
	INCT	48	2615			
	HEIM	141	2223			
	PRTC	142	2379	/		approx 2380
	TWCD	70	4095			0000–4094
	TSAM	72	4095			0640–1860 | < *min*
	O3	100	0185			
	O3P	106	1487	934.2		P≃ (*DRSU* × 0.4) + 145*mB*
	O3RG	113	2101			
1334						

Flight Leader's ~~Pre~~/In-Flight Check List

M. Law

Flight No: A531 Date: 02 04 97 Page 3 of 3

CHEK for auto selection

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
1400	REF +	5	0567	✓		Approx 0568
	REF -	7	2856	✓		Approx 2858
	AOSS	19	1784	F/S O/S	TORQUE	2047 st. and level
	AOA	18	1263	F/S O/S	TORQUE	2047 st. and level
	RD HT	37	4095	FL 060	✓	As Indicated | 0000
	PR HT	8	3133	5.8	✓	As Altimeter
	CABP	14	3450	1050		
	A/S	9	1335	180	✓	As ASI | 0000 – 0100
	UP1S	81	1931	635	637	
	UP2S	82	1513	275	323	
JNO2	UIRS	83	791	-244	1558	
	UP1Z	84	150	✓		Approx 0147
	UP2Z	85	146	✓		Approx 0149
JNO2	UIRZ	86	781			Approx 2061
	UP1T	87	2596	12	6.4 ✓	As IAT
	UP2T	88	2616	12		As IAT
JNO2	UIRT	89	0000			As IAT
	LP1S	91	715	228	264	
	LP2S	92	958	105	121	
JNO2	LIRS	93	427	-320	1558	
	LP1Z	94	151	✓		Approx 0150
	LP2Z	95	158	✓		Approx 0146
JNO2	LIRZ	96	379	✓		Approx 2050
JNO2	LP1T	97	2826	-1	-8.3	As IAT
	LP2T	98	2832	-1		As IAT
JNO2	LIRT	99	0000			As IAT
HYG	J/W	42	1176	0.0		As Indicated | 0000
	HYGR	58	1577	-28	-26	
	HYCC	59	0789	✓		696–901
	FDEW	138	938	-53.1		DP = (DRSU/20)-100 C
	FSTA	139	965			
	DTF	10	1640	-11		
	DTC	11	4			
	NDTF	23	4095	✓		same as De-Iced
	NDTC	24	0007			
	INCT	48	2492			
	HEIM	141	2140			
	PRTC	142	2379	✓		approx 2380
	TWCD	70	4095	✓		0000–4094
	TSAM	72	4095	✓		0640–1860 | < *min*
	O3	100	136			
	O3P	106	1637	799.8		P≃ (*DRSU* x 0.4) + 145*mB*
	O3RG	113	1977			
1440						

Flight Leaders' ~~Pre~~/In-Flight Check List

BCDS for auto selection

GMT	PARA.	NO.	H/D	D.R.S.	DECODE	INSTR	EXPECTED VALUE
1500	FL NO	1	Hex	0531	✓		Flight No.
	GMTH	2	Hex	0150	✓		Clock: First 4 No.s
	GMTM	3	Hex	0024	✓		Clock: Last 4 No.s
	E/M	4	Hex	0021	✓		Event Mark Counter
	INCH	49	Dec				Multipxd Hkeeping
-33 1446	1260 / 3855	1444	2372	1463	3221	1439	0172 ✓
	LATC	160	Dec	0581	51.12 N	✓	Latitude
	LONC	161	Dec	4040	4.48 W	✓	Longitude
1504							

Total Water Content Meter Check List

TOTW for auto selection Height:

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES	
						INFLIGHT	*PREFLIGHT*
	TWCD	70				0001–4095	
	TNOS	71				2000–3460	< *min*
	TSAM	72				0640–1860	< *min*
	TAMB	73				2400–3200	
	TSRC	74				2160–2470	
	HTR1	75				0000–4095	< 4095
	HTR2	76				0000–4095	< 4095
	ISRC	77				0001–1230	< *min*
	STAT	78				4095	
	EV1V	170					
	EV2V	171					
	NPWR	172					
	EVIC	173					
	EV2C	174					

BROAD BAND RADIOMETER FIT (pre-Flight only)

	PARA NO	POSITION	DOME	COVERS	OBSCURERS
UPPER	81,84,87 82,85,88 83,86,89	Port Stbd Centre	Clear Red Silicon	Off / On	Large/Small
LOWER	91,94,97 92,95,98 93,96,99	Port Stbd Centre	Clear Red Silicon	Off / On	

Flight Leader's In-Flight Log

608 P1
MP P2
30 N
NN E
KQ LM

Flight No A 531 Date 02 04 97 Page 1 of 2

Video Tape
No. A531 #1
Ends 1600
FFC / DFC / RFC

	GPS	INU
Lat	51°09.83N	51°09.83 N
Long	1°44.61W	01°44.60W
Time	10:18	101700
Status	GPS	GC ALIGN

DRS recording to HORACE (y) / n

HORACE recording to disc (y) / n

SATCOM sending pos. reports (y) / n

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
100435				DATA	ON					
	Power set tripped when switched on			Aux	Pump.					
~~201218~~	123005			SET	TO	NAV.				
125535				TAKE	OFF	BOSCOMBE		DOWN		
			Level	3000	R-	RUN	1			
1258		3000	1006	270	180	4.0	1.2	OFF		249/3
1304			Heimann Cal P09							
			Cond	Run 1	Start	P1.		↗	500 FPM	
131016	6	3000	1006	270	180	2.0	2.0	OFF		302/6
			END	P1	// START	RUN	2.			
131345	7	FL050	1013	270	180	5.5	0.8	OFF		298/13
			Heimann	Cal	P05					
			END	RUN2	// START	P	2	↗		1000/min
132232	8	FL050	1013	270	180	5.7	-2.3	OFF		294/12
			END	P2	//	START	RUN 3	↗		
133220	9	FL150	1013	275	180	-13.9	-29.1	OFF		263/13
			END	RUN 3	//	~~START~~	~~P3~~	↘		
135216	10	FL150	1013	275	180	-13	-28	OFF		269/15
				START	P 3		↘			-500FPM
135421	11	FL150	1013	180	180	-13.0	-28.7	OFF		270/17

Video Tape
No. A531
Ends 1600
FFC / DFC / RFC

	GPS	INU
Lat	50° 37·75 N	50 35.00 N
Long	006° 19·08 W	6 19 53 W
Time	135629	135718
Status	OK	NAV

DRS recording to HORACE (y) / n

HORACE recording to disc (y) / n

SATCOM sending pos reports (y) / n

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
		2000			P3.	changed to		500 FPM		
140449	12	FL090	1013	290	180	~~60~~	~~-2.6~~	OFF		279/9.
140643	13					7·3	-2·6			
		INT	~~END~~ P3							
140837	14	~~50 FL 300~~	1013	290	180	8.6	3.6	OFF		236/04
			Restart P3.				↘			500 FPM
141006	15	800FT	1013	360	180	8·6	6·1	OFF		
			END	P3						
141058	16	500 FT	1020.							3522
			START		RUN	4				
141124	17	800FT	1020	360	180	8·4	6·5	OFF		230/5
1420		Gave	up to	avoid	cloud.					
			END	RUN	4					
142620	18	9100	1020	360	180	7·7	5·4	OFF		228/9
			START	P 4	↗					
142711	19	11000	1020	175	180	7·0	1·1	OFF		254/12
			END	P 4	↱					
145339	20	FL270	1013	350	160	-39·9	-52·1	OFF		288/13
			START	RUN 5						
145507	21	FL270	1013	080	180	-39·9	-52·9	OFF		265/14
			END	RUN 5						
151156	22	FL270	1013	080	180	-41	-53	OFF		270/18

Flight Leader's In-Flight Log

01223
336518
6473 FAX
Kathy @ ATM.CH.CAM.AC.UK

Flight No A 531 Date 02 04 97 Page 2 of 2

617/618

Video Tape
No. A531 #1
Ends 1600
(FFC) / DFC / RFC

	GPS	INU
Lat	51°17.43N	51°17.31
Long	3°51.81W	3°54.23W
Time	1514	1515
Status	OK	NAV

DRS recording to HORACE	(y) / n
HORACE recording to disc	(y) / n
SATCOM sending pos. reports	(y) / n

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
				START	P5	TJ				
51304	23	FL270	1013	260	180	346 353	-52	OFF	1000/min	272/15
				END	P5	TJ	START	RG		
72507	24	FL150	1013	095	180	-13.6	-35.8	OFF		262/15
				END	RG					
74150	25	FL150	1013	100	180	-13.8	-30.4	OFF		258/16
75315				LAND	BOSCOMBE					
75903				HOLD	RT.					
						51 09	85			
						1 44	63			
38	163753			DATA	OFF					

rch Flight

VIDEO TAPE LOG

Flight No A 531

Project ACSOE Date 02 04 97

Tape No A531 User KAYE Retention Period 10 YRS

GMT	Tape Counter	Camera Position	Remarks
1300	0	FFC	RUN 1 3000FT
131016 - 131345			P1 3000FT - FL050
131345 - 132232			RUN 2 FL050
132232 133220			P2 FL050 - FL150
132220 135216			R3 FL150
13 5421 14 1058			P3 FL150 - 500FT
14 1124 - 142620			RUN 4 800FT
142711 - 145330			P4 1100FT - FL270
145507 - 151156			RUN 5 FL270
151304 - 152507			P5 FL270 - FL150.
152507 - 154150			RUN 6 FL150.
1600			End Tape.

Met Research Flight

...in pressure parameter = 419

Injection time = 60 s

ONLY TWO ac's RESPONDING (B + C)

no humidifier

PAN GC Log

GC Sample record | **Flight Number:** A531 | **Operator:** RICHER / KENT | **Date:** 2/4/97

Sample No.	Time	Height	Channel 1 (A) Optimisation = ST	SP	DT	DP	BT	FR	Channel 2 (B) Optimisation = ST	SP	DT	DP	BT	FR	Channel 3 (C) Optimisation = ST	SP	DT	DP	BT	FR	Comments
—	—	—						25.88						24.87						24.28	PREFLIGHT
1	13:01	3000ft																			STAGGER ON AUTO ON ← IGNORE FIRST SAMPLE
2	1307		315.55	2700	35.1	1805	30.4		317.65	1569	29.7	1262	00.4		317.75	2377	27.3	1275	00		NO SAMPLE
3	131622	5000ft	315.35	2068					318.05	2356					314.35	2206					PEAKS VOLTAGE AUTO SCALE? BASELINE OFF CABIN PRESSURE =
4	133418	FL150	315.55	2273	35.9	689	31.4		318.55	2507	29.8	1200			315.3	2346	26.5	213			
5	134345	FL150			36.0	1451	31.5				29.8	1206					27.4	1214			3
6	135013	FL150	315.45	2137					314.15	1915					315.35	1768					SAMPLE TOO
7	141152	7000ft	315.15	2762	35.8	1512	30.8		318.45	2457	29.7	1271			315.05	2300	27.4	1286			LATE FOR RUN (END OF RUN)
8	142013	7000ft	315.25	2737	35.8	1512	30.7		314.45	2468	29.7	1231			315.05	2312	27.7	1287			(SAMPLE RATHER LATE - PEAK AT END OF RUN
9	145502	FL270	315.25	1521	35.8	1277	30.5		314.45	1322	29.8	1004			315.5	1187	27.4	1006			LARGE PEAK).
10	150320	FL270	315.25	1528	35.7	1266	30.1		318.35	1336	29.8	989			315.15	1336	27.3	992			11
11	152606	FL150	315.05	2088	35.3	1443	28.6		317.25	1116	29.5	1187			313.55	1147	27.1	1199			LOTS OF NOISE - AIRCRAFT SPEED = 225 KNOT
12	153520	FL150	315.05	2069	35.0	1439	28.5		316.75	1183	29.5	1184			313.95	1147	27.0	1195			11
13	1610	GROUND	315.2																		
14	16219	GROUND	315.25	2819					315.45	2587					3375	2427					

BF 28.10 BF 20.35 BF = 31.13 (Bubble flow meter)

NOxy Instrument *Pre-Flight* Log Sheet

Flight No: 531 Date: 2/4/97 Page: 1 / 1

Campaign: ACSOE/OXICOA Operator(s): Green/Bauguitte

Time (GMT)	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments
12 10	NOxy shutdown, ready for power switch over					
	control box & snoppers back on power (gnd) to keep heaters on					
	while waiting for power switch over					
12 29	1st engine on					
	NB: 4-5 mins for powering all engines					
4th engine started @ 12:29						
12:32 converter	NOxy - full shut down for power s/over					
~~NOxy shutdown, ready for power s/over @ 12:10~~						
12 47	ARIF.	Started before taxi for takeoff				

Note: All times logged as GMT

Delivery Gases (Gnd-A/C) Change Over Time: ~12:10

Power Change Over Time: 12:33

Can Flush On: 12:48

NOxy Instrument *In-Flight* Log Sheet

Flight No: 531 Date: 2/4/97 Page: 1 / 2

Campaign: ACSOE / OxICOA Operator(s): Green / Baugnitte

Take-Off Time: ~1255 Can Flush Off: 1257

Note: Enter Sequence (SEQ.) as Calib, Zero, Artifact

Time (GMT)	Altitude	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments	Run
1302	3300	end of	ARTIFACT →				AMBIENT AIR	
13.0620	3300	ZERO	4600	2300	1300	1000	1st zero (sequenced)	
1310							start of profile P1	P1
13.1345	5000						end of P1	P1
NB	just ZA values on Manual for end-of-flight artifact.							
	1st calibration (for NO only GPT all shutters not adjusted)							
133220	15000						end of P2 start of R3	
1333	~~ZERO~~	~~450~~ ?						
1333	15000	ZERO	450	2350	1250	1000	sequenced	
133650	15000	CAL	97000	97000		on	NO & NO2 detectors	
133750	15000	CAL			100000	80000 on	NOy1 & NOy2 detectors	
1347	15000	ZERO	950	2300			on NO & NO2 — CAL on	
1348	15000	ZERO	~~1750~~	~~900~~	1750	900	on NOys (off on NO)	
1350	15000	CAL	OFF					
1352	going down		to 50'				end of Run 3	
~~1354~~								
141220	700	ZERO	310	1900	1000	650	sequenced	
1424	700	ZERO	300	1800	900	580	not sequenced	
142550	700	ZERO	off					
142620							end of R4 ~~started~~	
142711	↑						start of profile to Max Alt P4	
1446	20.5kft		NO2 flow shifted @ 1514				NO2 cell P still holding @ 280 torr	
1447	22 kft		NO2 cell flow dropping					
1449	23.5kft		~250 torr (NO2 cell P)					
1450	24.5		~230 torr					
145336	27 kft		~ 190 torr				end of P4	
145507	27kft						start of R5	
↓ NO2	Press. control valve orifice adjusted →					244	torr (Max. Press. achieved)	
1508	~~27~~	ZERO	550	2200	1150	820	SCAVENGED	

Note: All times logged as GMT

NOxy Instrument *In-Flight* Log Sheet

Flight No: 531 Date: 2/4/97 Page: 2 / 2

Campaign: ACSOE/UKICOA Operator(s): Green/Lanquette

Take-Off Time: 1255 Can Flush Off: 1257

Note: Enter Sequence (SEQ.) as Calib, Zero, Artifact

Time (GMT)	Altitude	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments	Run
1513	27kft ↓						start of P5	
	NO_2 cell	press. increasing ~ 1						
1515	25kft	transducer crossed → increase on all 4 channels						
1518	22kft	NO_2 cell press. @ 300 torr						
1525	15kft	NO_2 cell press @ ~415 torr						
1530	15kft	NO_2 cell pressure control					end of P5 & start of P7	
		valve back @ ~280 torr						
1531	15000	CAL	81000	100000	91200	78000	shutter off – NO cal on 4 channels	
NB-	NO & NO_2 signals undulations observed again							
1540	15000	zero	900	2100	1570	740	not sequenced.	
1541	15000	zero off						
1542	15000	cal off						
1544	↓	ARTIF.					sequenced.	
1548	↓	NO_2 cell press. ~5PSI					@ 600 torr	
1550		can flush on					↓ wait for readjust on gui	

Note: All times logged as GMT

NOxy Instrument *Post-Flight* Log Sheet

Flight No: 531 Date: 2/4/97 Page: 1 / 1

Campaign: ACSOE / CXICOA Operator(s): Green / Bauguitte

Landing Time: 15 53 Power Change Over Time: 16:01

Delivery Gases (A/C-Gnd) Change Over Time: 16.11

Time (GMT)	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments
15 55		Zero flush off				
15 56		NO2 Full Press. @ ~700 Torr				
16:00		Ozonizers off & O3 box off (lamps cooled)				

Note: All times logged as GMT

Instrument Shutdown Time: _____

FORMALDEHYDE INSTRUMENT LOG SHEET

Date: 2/4/17 Flight No. A531 TEST Flt Operator: GRAHAM Page: 1 of 4

Air Sampling Rate: 1·54 L/min Peristaltic Pump Speed (rpm): 3 PMT Sensitivity: 80

Calib Factor (V to ppt): 1mV = 7·5ppt Approx Lag Time: 5 Mins React Coil Temp: 91 °C

320 ~ ambient

_____ drs Bits = 1V

Time (GMT)	Zero/ Amb	Inst. Output (V)	Other info/Remarks e.g altitude, lamp output, Sampling rate changes etc.
			Pre Flight-
09:18:50	Z	0·75	Restarted after power down.
			Lamp = 7·26V
			Air bubbles a bit erratic.
			10/12 Min Zero is Good
09:21:51	A	0·74	STARTED outside sampling.
09:23	A	0·73/2	
09:24:20	A	0·70/1	
09:26:21	A	0·75	Equilibrate time = ~ 4:30
09:28:50	A	0·96	
09:29:30	A	0·98	
09:41:00	Z	0·73	
09:44:07	Z	0·72	
09:45:00	A	0·73	Changed Zero ⇒ 10 Mins / Amb 10 Mins
~~09:50:30~~	~~A~~	~~0·87~~	STARTED Ambient cycle
09:50:30	A	0·87	
9:53:30	A	0·98	
10:00 TSN	—	—	TROST ALL Power.
10:02 —	—	—	Restarted System — Ambient Sample.
10:04:50	Z	1·28	STARTED 10 Min Zero after ~ 2/3 Mins ambient sampling after Restart.
			Lamp = 7·23 V.
10:21 —	Z	1·61	Set Zero to 8 Mins. / Start. Zero
10:26:00	Z	— 7	Starting to go down
10:30:00	A	0·72	
10:32:00	A	0·71	
10:35:05	Z	1·35	Started 6 Minute Zero
10:39:43	Z	1·64	
10:46:30	A	0·73	Not quite long enough Zero
			Set to 6:30
10:52:36	Z	1·65	Started 6:30 Zero.

Formaldehyde Instrument Log Sheet

Page: 2 of 2

Flight No: A 531 Date: 2/4/97

Campaign: ACSOE (TEST Flt) Operator(s): GRAHAM MILLS

Air Sampling Rate: 1.5L SCM Peristaltic Pump Speed: 3 (rpm)

PMT Sensitivity: 30 Calib Factor: 1mV = 7.5 ppt (V to ppt) _____ drs Bits = 1V

Approx Lag Time: 4:50 React Coil Temp: 91°C

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
12:15:00	—	—	POWERED DOWN + PUMP ISOLATED FOR POWER TRANSFER
12:58:6	Z	0.87	TAKE OFF 12:55:17 + STARTED ZERO CYCLE:
13:01 37	Z	300+	SET BOOM PUMP TO 7.00 TO BODY clear SOLNS.
13:03	Z	.95	RETURNED TO 3.00 RPM.
13:07:18	Z	0.63V	—
13:07:30	Z	—	WENT INTO CLOUD
13:07:30	Z	0.70	
13:10:04	A	0.70	CLIMBING @ 500' per Min initial started ambient sample
13:14:30	A	0.71	5000 feet. ~~[illegible]~~
13:15:30	A	0.75	~~Some Stratocu during climb~~
13:17:00	A	0.80	SYSTEM WORKING OK Some Stratocu seen during climb
13:18:55	A	0.80	
13:20?	A		Start Profile (2) to FL150 @ 1000 FPM
13:29:06	A	0.78	Climbing Still "
13:30:00	A	0.73	
13:32:20	Z	0.74	Start Run (3) - Started Zero @ FL150
13:34:41	Z	0.75	Temp = 88.9°C
13:39.27	Z	0.71	Pump Samples @ 0.8 SCM
13:43:06	A	0.68	Started ambient Sample - END Zero Sample Rate = 0.92 SCM
13:47:00	A	0.67	

Formaldehyde Instrument Log Sheet

Flight No: A531 Date: 2/6/97 Page: 3 / 4

Campaign: _____ Operator(s): _____

Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
13:50:20	A	0.71	fl ISO -
~~13:52~~			
13:56:21	A	0.67	Start Profile (3) from FL ISO
			ending 175
14:07:45	A	0.70	inside boundary layer
14:08:32	A	0.70	Multiple profile @ 300'
14:10:06	A	-	Profile - fm 800'
14:11:07	A		end Profile (3) return to 800'
14:11:34	Z	-	started Zero, @ 800' Run (4)
14:18:30	Z	0.68	
14:20:16	Z	0.68	END Zero started Amb. Sample
14:26:20	A		end of run (4) starting climb
14:27:11	A	0.73	Profile A to 27000'
			Sampling @ 1.56 SLM
14:32:50	A	0.78	flow = 1.38 SLM
14:36:30	A	0.73	flow = 1.21 SLM
14:37:30	A	0.71	Flow = 1.10 ~12000'
~~14:39~~			
14:39:30	A	0.71	flow = 1.00 SLM
14:42-	A	0.69	flow = 0.87 SLM FL 170
14:45:30		0.67	flow = 0.75 SLM ~20000
14:49:40	A	0.69	flow = 0.60
14:53:-	Z	0.67	started zero - ~~Started~~ flow = 0.64
			end Profile (3)
14:55:07	Z	0.70	Start run (5) at FL 27000
			Temp: 85°C -
			Having a few flow issues in debubbler

Formaldehyde Instrument Log Sheet

Flight No: A 531 Date: 2/6/97 Page: 4 / 4

Campaign: _____ Operator(s): _____

Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
1:01:00	Z	0.65	- Zero a bit noisy at this altitude.
15:02:31			de-bubbler caused working.
15:06:57	A	0.791	de-bubbler fixed - working ok again. Flow = 0.51
15:11:06	A		End of Run (5) - descending.
15:12:56	A	0.71	
15:13:00	A		Start Profile (5) from FL220
15:15:52	A	0.69	Flow = 0.58
15:18:34	A	0.67	27600', ozone blip approx here. Flow = 0.67 SLM
15:21:06	A	0.67	Flow = 0.75 - FL190 + descending
15:24:46	A	0.63	flow = 0.70
15:25:07			End Profile (5) now @ FL150
15:25:30	Z	0.63	STARTED ZERO START Run (6). Flow = 0.80 h (lower than above because of charcoal filter)
15:38:00	Z	0.68	Lamp = 718. Flow = 0.80
15:36:08	A	0.67	End Zero - Start ambient Sample.
15:38:00	A	0.66	Air Sample rate = 0.91
15:41:50	A	0.66	End of run (6)

DATE 2APR97 TI MRF 01 NAV CANNING

AIRFIELD BD F1 AIRFIELD BD 1

R/W 23 W/V 270/05 TEMP +15 QNH 1020 OFE 1006 R/W 23 W/V 260/8 TEMP +15 QNH 1018 OFE 1003

WX F/S BLU RE 1018 10K 3/3500 WX S BLUE RK 2/3800

ATC CL F150 ATC CL

T/O TIME 1255 LAND TIME 1555 3:00

TIME	HDG	DR	G/S	IAS	TAS	W/V	ALT/FL	QNH/PR	LAT/LONG	RUN
1316	267	3P	169	180	193	34/18	150		N51023 W02557	P1
1345	265	4P	175	189	200	29/24	F150		N51018 W03075	T2
2238	267	4P	170	182	202	29/22	F150		N50585 W03473	P2
3223	267	1S	198	182	222	259/24	F150		N50562 W04350	R3
5216							—		N50510 W06202	—
5421	180	7P	228	183	228	231/32	F150		N50447 W06208	P3
1408 57							900		N49791 W06226	—
1124	353	2S	179	180	180	231/08	800		N50064 W06233	R4
2620									N50520 W06275	—
2711	167	6P	181	182	185	241/20	1000		N50522 W06246	P4
5330									N50471 W05554	—
5507	070	1S	290	170	270	266/2	F270		N50516 W05470	R5
1511 54									N51217 W03456	—
1804	256	2P	237	181	275	279/30	→		N51189 W03430	P5
2507	091	2P	254	183	277	260/28	F150		N51056 W04175	R6
4150									N51055 W02269	—

DISK PROFORMA/NAVFORM

A531, 2nd April, 1997
ACSOE
Shake Down Flight

Start time	End time	Event	Height(s)	Hdg	Comments
125535					Take off from Boscombe
125800	131016	R1	3000'	270°	Instrument warm up run
131016	131345	P1	3000'-FL050	270°	500 feet per min
131345	132232	R2	FL050	270°	
132232	133220	P2	FL050-FL150	270°	1000 feet per minute
132220	135216	R3	FL150	270°	
135421	141058	P3	FL150- 500'	180°-290°	1000fpm to 2000'
141124	142620	R4	800'-1100'	360°	Climbed to avoid cloud.
142711	145338	P4	1100'-FL270	180°-360°	1000fpm
145507	151156	R5	FL270	080°	
151304	152507	P5	FL270-FL150	260°-095°	1000fpm
152507	154150	R6	FL150	100°	
155315					Land at Boscombe

FLIGHT LEADER'S INSTRUMENT STATUS REPORT

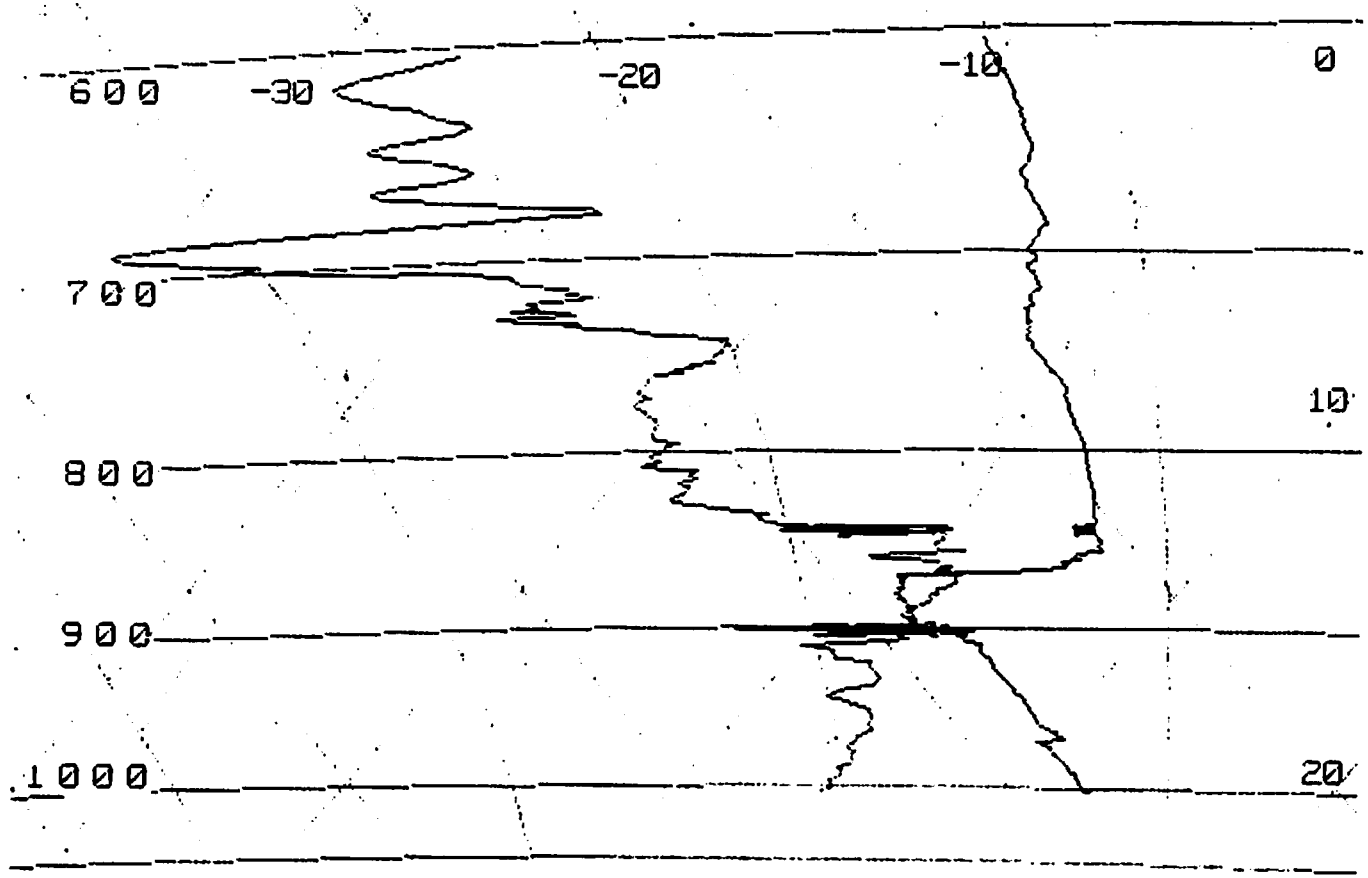
FLIGHT NO: A531 DATE: 02 / 04 / 97 MRF

INSTRUMENT	FITTED	OPERATED	COMMENTS
NAVIGATION:			
GPS	✓		
OMEGA	✓		
INU	✓		
RADALT	✓		
THERMOMETERS:			
DI TEMP	✓		
NDI TEMP	X		
ICTP	✓		
HEIMANN	✓		
HYGROMETERS:			
GEN. EASTERN	✓		
TWC	X		
FWVS	✓		
J/W	✓		
EXP. PITOT HEAD:			
STATIC PRESS.	✓		
PITOT PRESS.	✓		
GUST VANES	✓		
RADIOMETERS:			
UPPER CLEAR	✓		
UPPER RED	✓		
UPPER SILICON	SNO2		
LOWER CLEAR	✓		
LOWER RED	✓		
LOWER SILICON	SNO2		
MARSS	✓		
SAFIRE	✓		
DEIMOS	✓		
ARIES	✓		
CHEMISTRY:			
OZONE	✓		
ECGC	✓		
NOX Y	✓		
OTHERS:			
CCN	✓		
CLOUD PHYSICS	✓		
CABIN PRESS	✓		
NEPHELOMETER	✓		
PSAP	✓		

P.T.O. FAULTS/INCIDENTS

A531 02-APR-97 13:30:57 008 50.95 -4.47 ASP

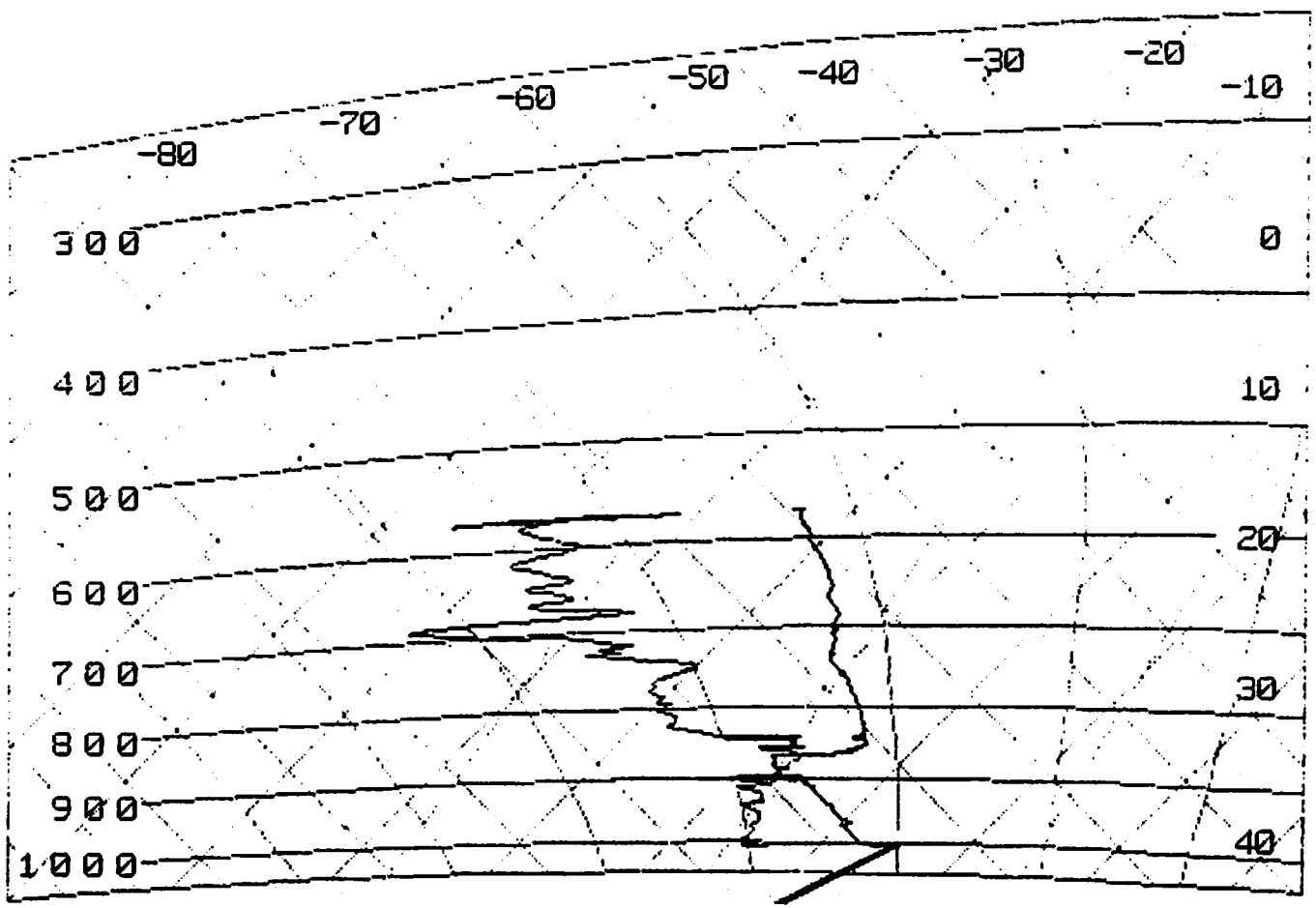
HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
267.	605.	13.6	222.	-10.8	-26.1	270/12	



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

A531 02-APR-97 13:40:45 009 Ω 50.91 -5.33 AS

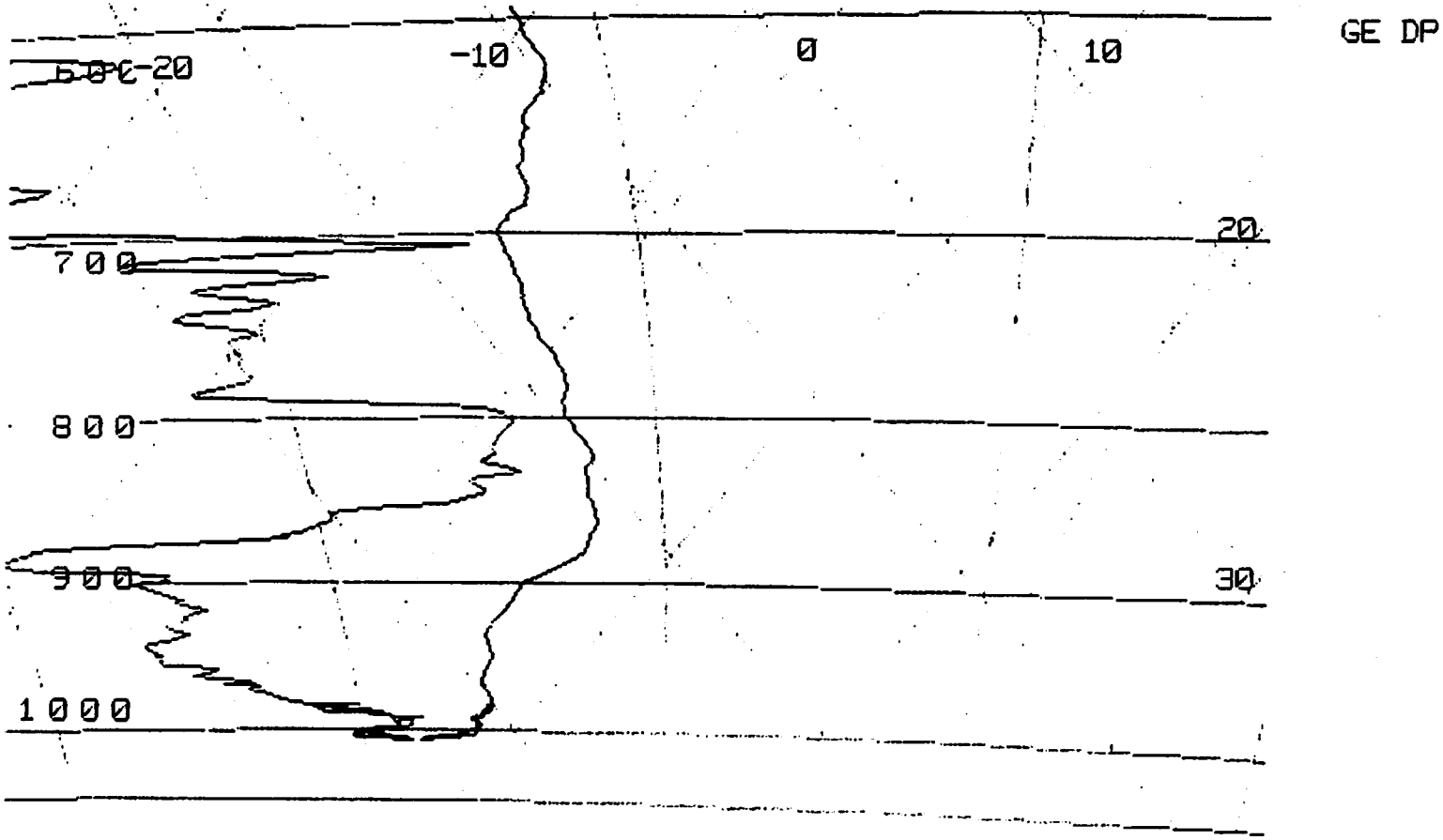
HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
266.	571.	15.0	223.	-13.4	-33.5	264/12



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

A531 02-APR-97 14:12:36 017 Ω= 50.18 P= -6.42 ASP

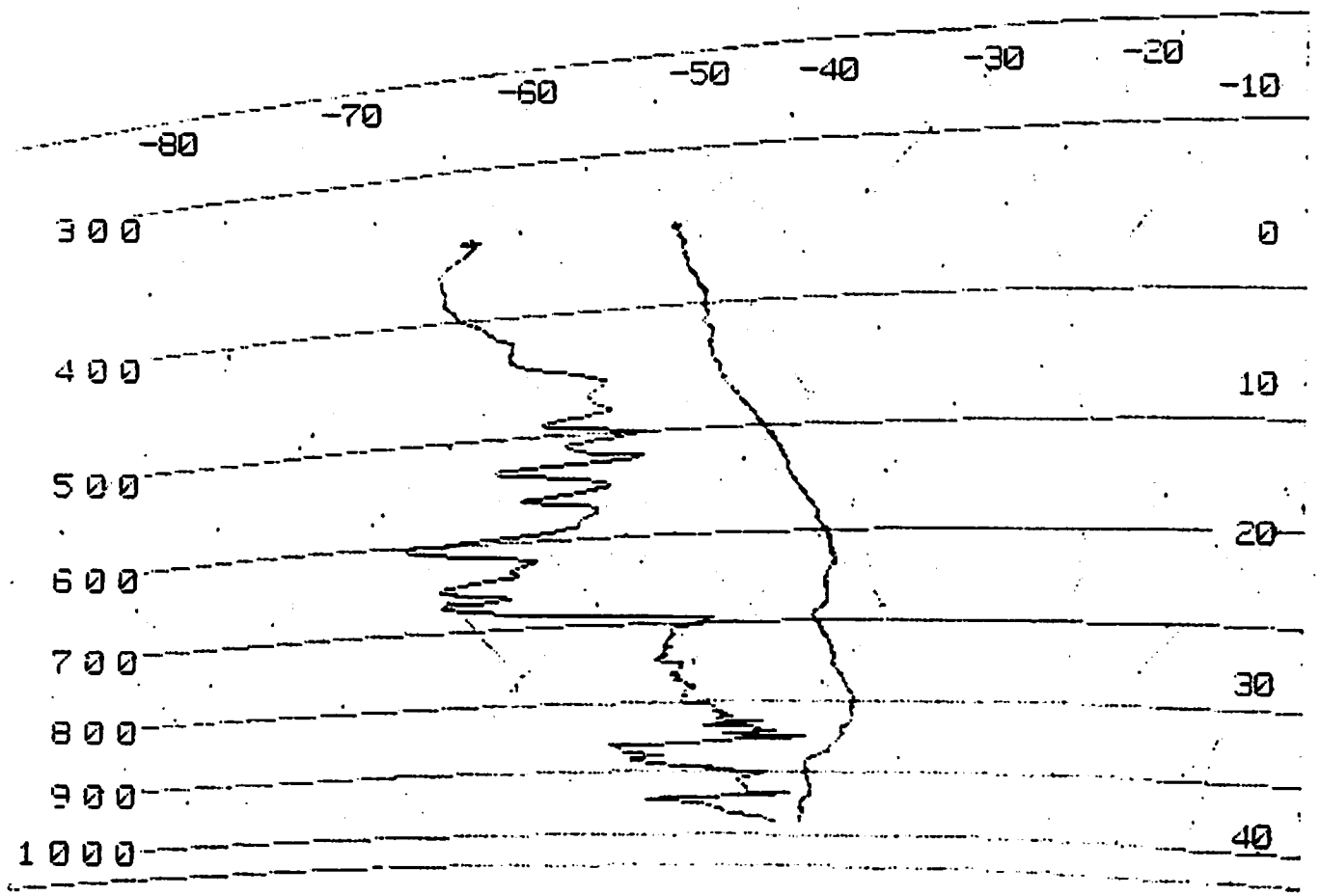
HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEWP C	WIND deg m/s
354.	992.	0.6	181.	8.2	6.4	231/ 5



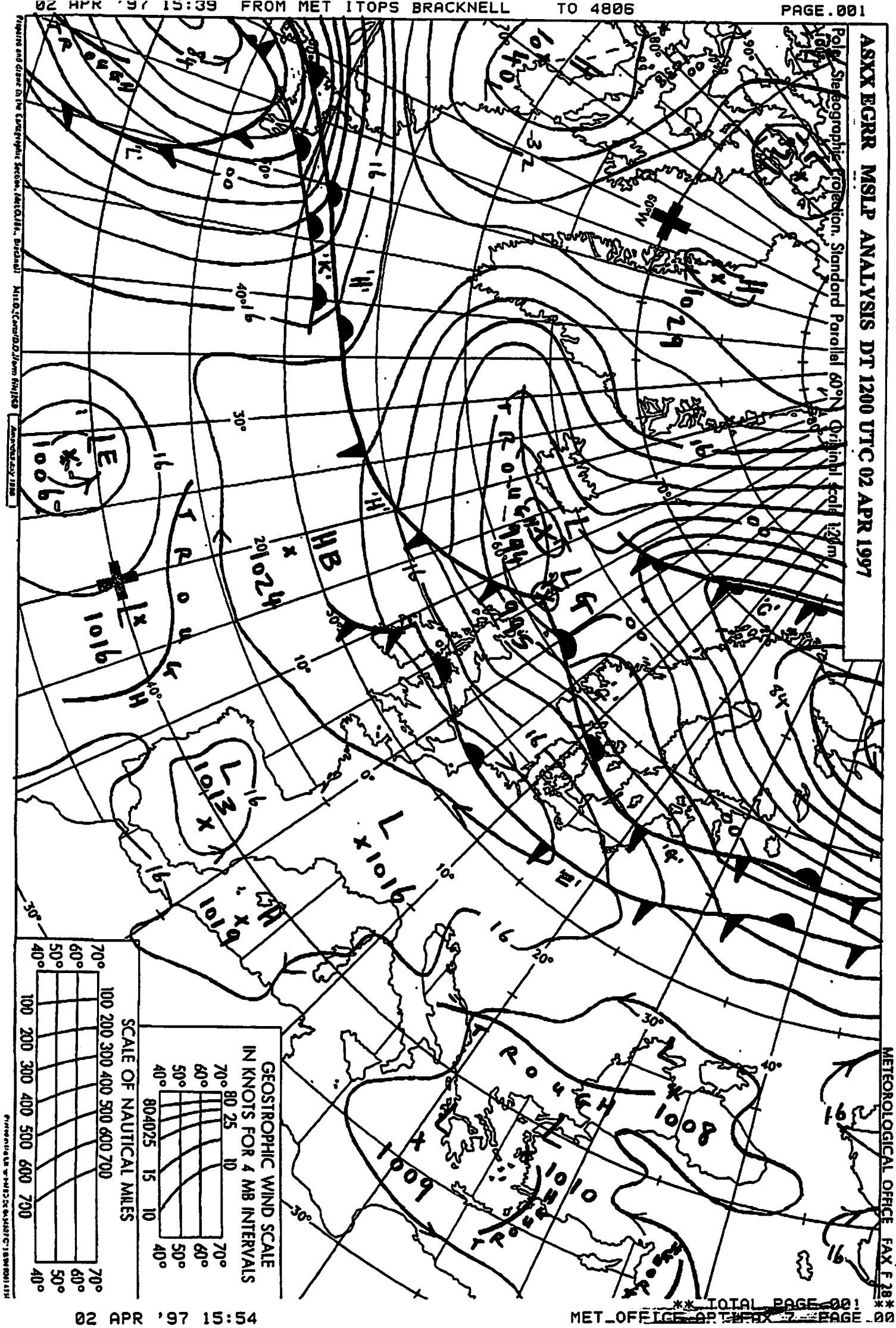
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

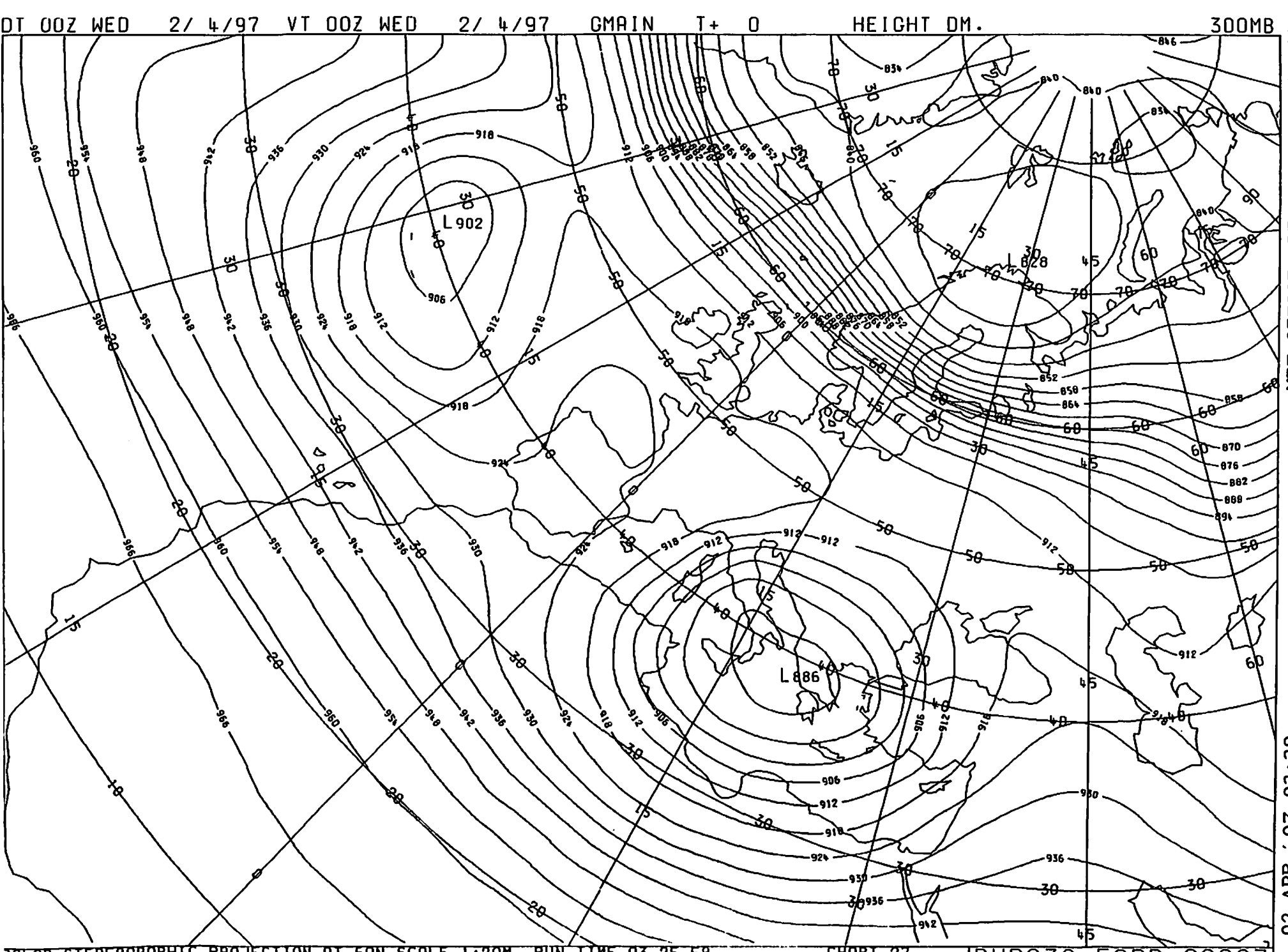
A531 02-APR-97 14:58:33 021 Ω 50.99 -5.40 ASTP

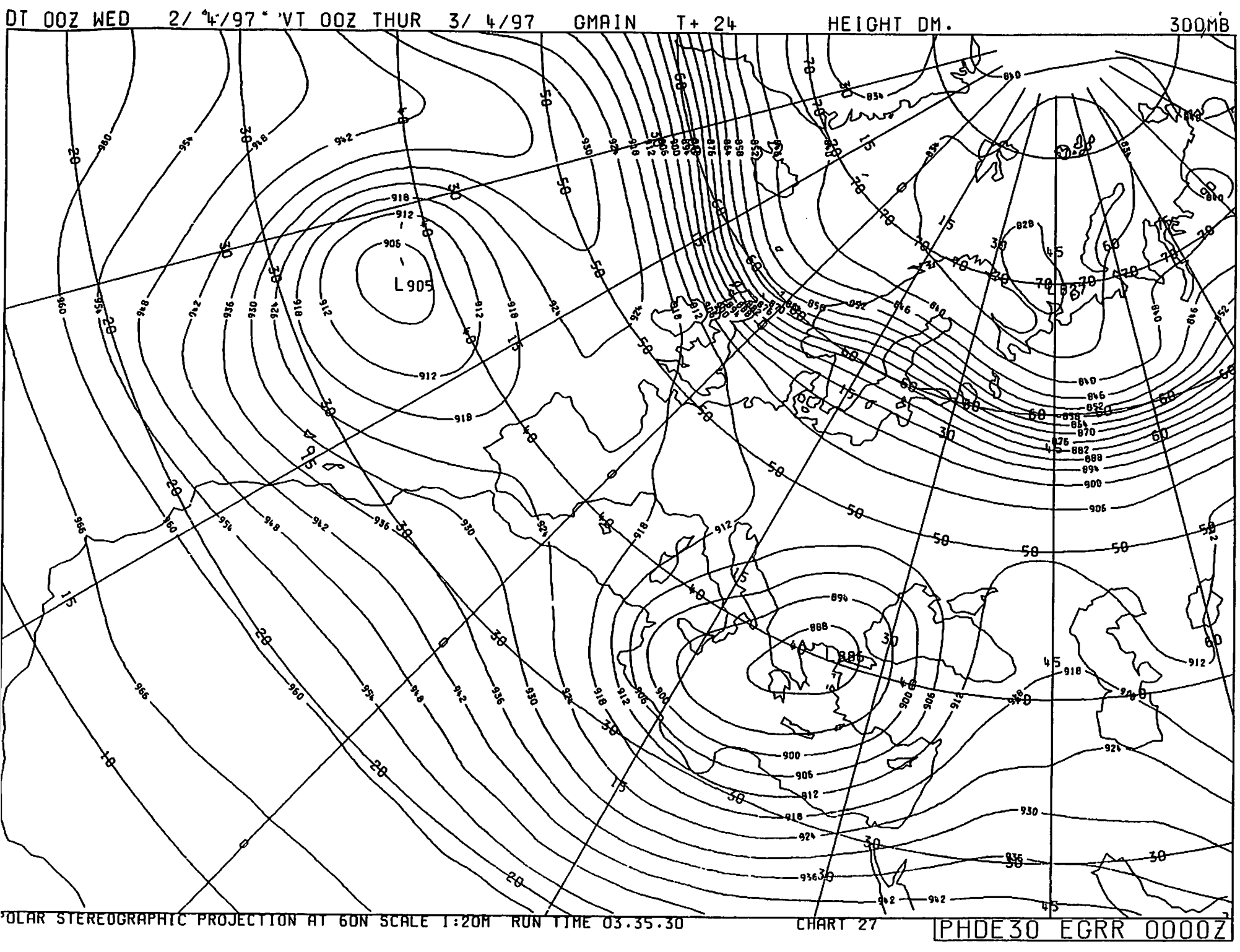
HDG degT	SPR mb	PHGT kfts	TAS knots	TAT C	DEW C	WIND deg m/s	
66.	346.	26.9	275.	-40.1	-51.7	262/14	

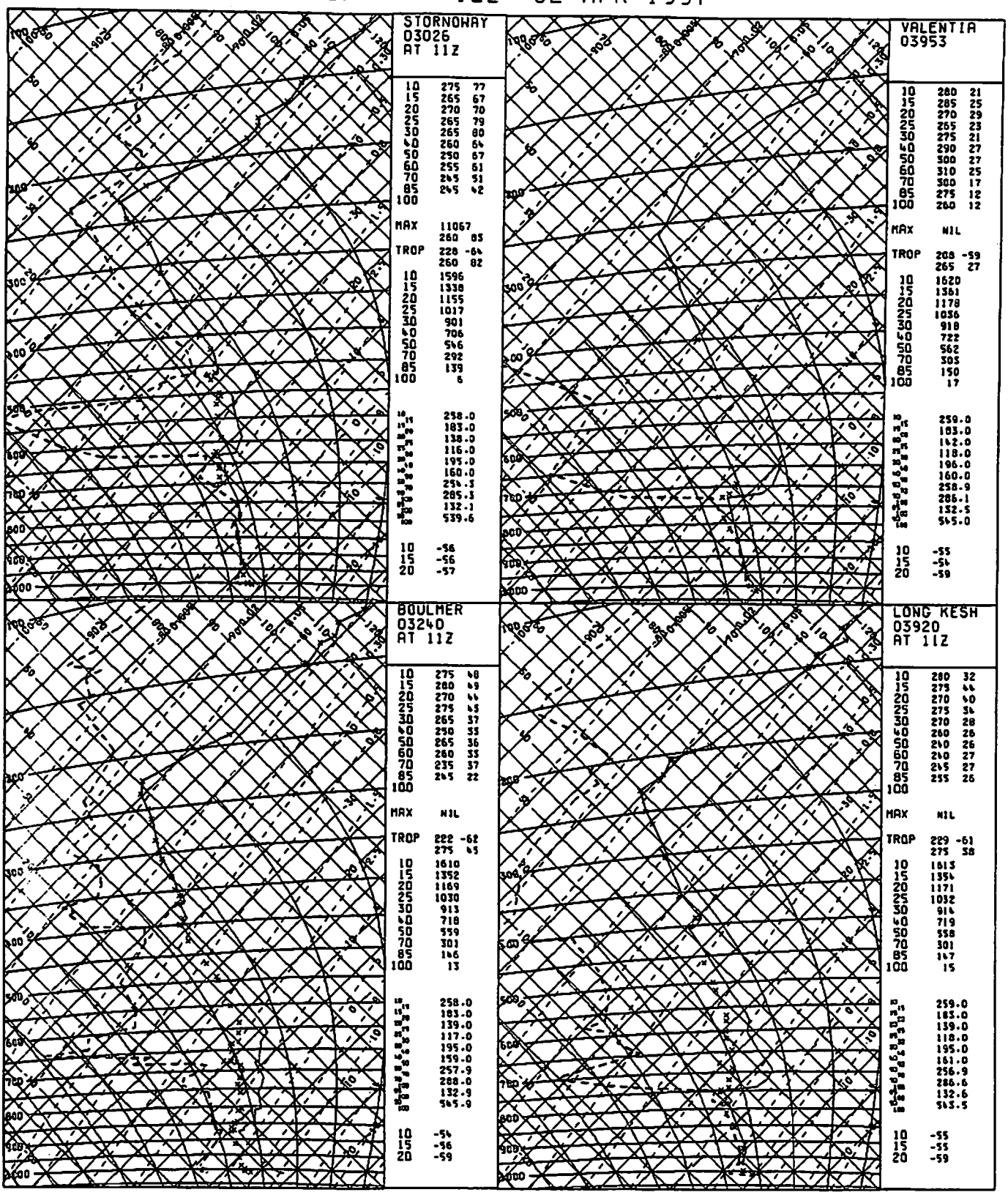


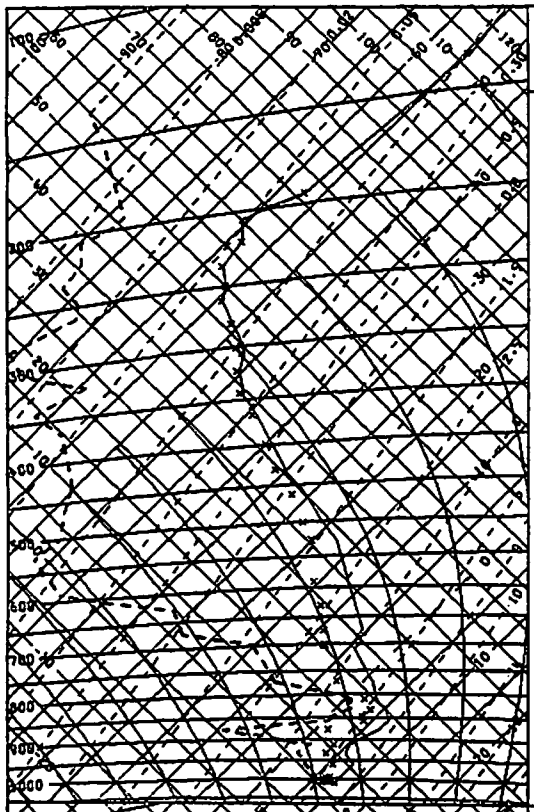
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP


ASXX EGRR MSLP ANALYSIS DT 1200 UTC 02 APR 1997
Polar Stereographic Projection. Standard Parallel 60°N. Original Scale 1:20m
GEOSTROPHIC WIND SCALE
IN KNOTS FOR 4 MB INTERVALS
SCALE OF NAUTICAL MILES
METEOROLOGICAL OFFICE FAX F 28**


DT 00Z WED 2/ 4/97 VT 00Z WED 2/ 4/97 GMAIN T+ 0 HEIGHT DM. 300MB
L902
L886
L828
MET_OFFICE_ARTIFAX_6 PAGE.001
02 APR '97 03:38
POLAR STEREOGRAPHIC PROJECTION AT 60N SCALE 1:20M RUN TIME 03.25.58
CHART 27
PHDA30 EGRR 0000Z


DT 00Z WED 2/ 4/97
VT 00Z THUR 3/ 4/97
GMAIN T+ 24
HEIGHT DM.
300MB
L905
L886
MET_OFFICE_ARTIFAX_7 PAGE.001
02 APR '97 03:58
POLAR STEREOGRAPHIC PROJECTION AT 60N SCALE 1:20M RUN TIME 03.35.30
CHART 27
PHDE30 EGRR 0000Z


STORNOWAY
03026
AT 11Z
10 275 77
15 265 67
20 270 70
25 265 79
30 265 80
40 260 64
50 250 67
60 255 61
70 245 51
85 245 42
100
MAX 11067
260 85
TROP 228 -64
260 82
10 1596
15 1338
20 1155
25 1017
30 901
40 706
50 546
70 292
85 139
100 6
258.0
183.0
138.0
116.0
195.0
160.0
254.3
285.3
132.1
539.6
10 -56
15 -56
20 -57
VALENTIA
03953
10 280 21
15 285 25
20 270 29
25 265 23
30 275 21
40 290 27
50 300 27
60 310 25
70 300 17
85 275 12
100 260 12
MAX NIL
TROP 208 -59
265 27
10 1620
15 1381
20 1178
25 1036
30 918
40 722
50 562
70 305
85 150
100 17
259.0
183.0
142.0
118.0
196.0
160.0
258.9
286.1
132.5
545.0
10 -55
15 -54
20 -58
BOULMER
03240
AT 11Z
10 275 48
15 280 49
20 270 44
25 275 45
30 265 37
40 250 33
50 265 36
60 260 33
70 235 37
85 245 22
100
MAX NIL
TROP 222 -62
275 45
10 1610
15 1352
20 1169
25 1030
30 913
40 718
50 559
70 301
85 146
100 13
258.0
183.0
139.0
117.0
195.0
159.0
257.9
288.0
132.9
545.9
10 -54
15 -56
20 -59
LONG KESH
03920
AT 11Z
10 280 32
15 275 44
20 270 40
25 275 34
30 270 28
40 260 26
50 260 26
60 260 27
70 265 27
85 255 26
100
MAX NIL
TROP 229 -61
275 38
10 1613
15 1354
20 1171
25 1032
30 914
40 719
50 558
70 301
85 147
100 15
259.0
183.0
139.0
118.0
195.0
161.0
256.9
286.6
132.6
543.5
10 -55
15 -55
20 -59



CAMBORNE
03808
AT 11Z

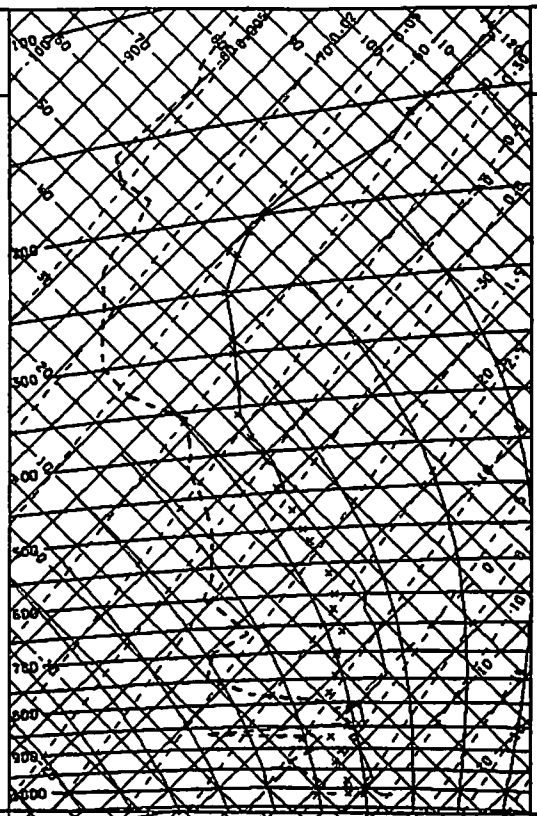
10	320	17
15	320	14
20	285	21
25	305	19
30	295	24
40	265	22
50	250	20
60	250	19
70	265	18
85	275	22
100		

MAX		3(MB)
	350	60
TROP	205	-61
	285	20

10	1620
15	1361
20	1179
25	1038
30	920
40	725
50	565
70	308
85	152
100	18

	259.0
	182.0
	141.0
	118.0
	195.0
	160.0
	257.5
	289.3
	133.4
	546.8

10	-56
15	-55
20	-59



HERSTMONCEUX
03882
AT 11Z

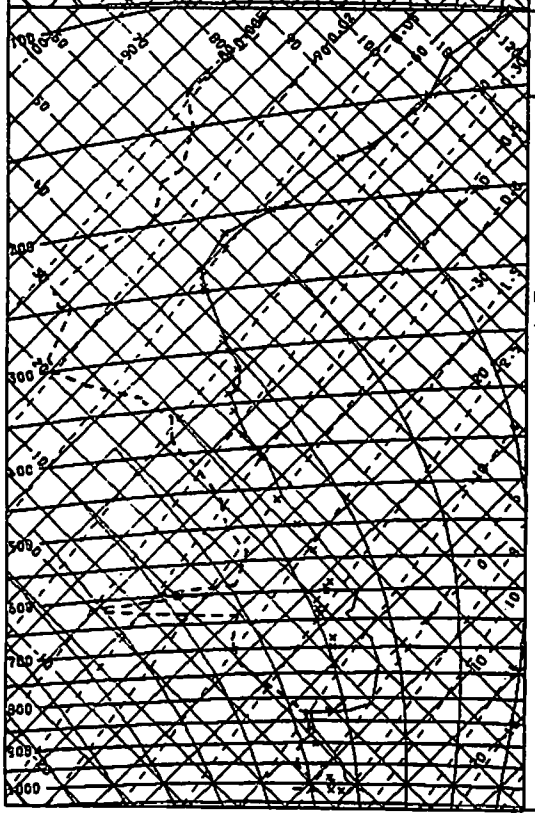
10	295	16
15	280	15
20	290	27
25	295	20
30	305	11
40	330	13
50	315	8
60	355	2
70	275	10
85	235	6
100		

MAX		NIL
TROP	210	-60
	295	18

10	1617
15	1360
20	1177
25	1037
30	918
40	724
50	565
70	307
85	151
100	18

	257.0
	183.0
	140.0
	119.0
	194.0
	159.0
	258.1
	289.1
	133.4
	547.2

10	-57
15	-55
20	-60



HEMSBY
03496
AT 11Z

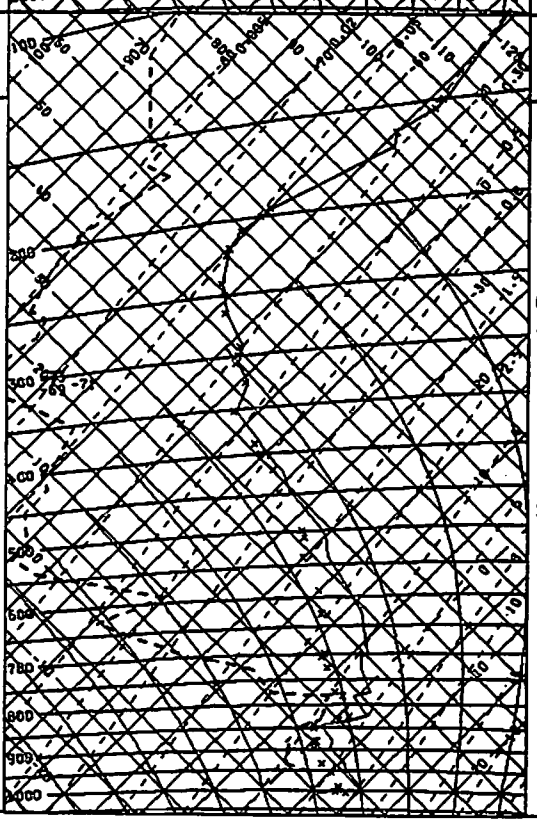
10	290	35
15	280	32
20	290	28
25	300	18
30	295	15
40	275	17
50	290	19
60	250	10
70	230	10
85	240	10
100		

MAX		NIL
TROP	211	-61
	295	26

10	1614
15	1356
20	1173
25	1034
30	916
40	722
50	563
70	305
85	150
100	17

	258.0
	183.0
	139.0
	118.0
	194.0
	159.0
	257.7
	288.1
	132.3
	545.8

10	-58
15	-55
20	-59



ABERPORTH
03502
AT 11Z

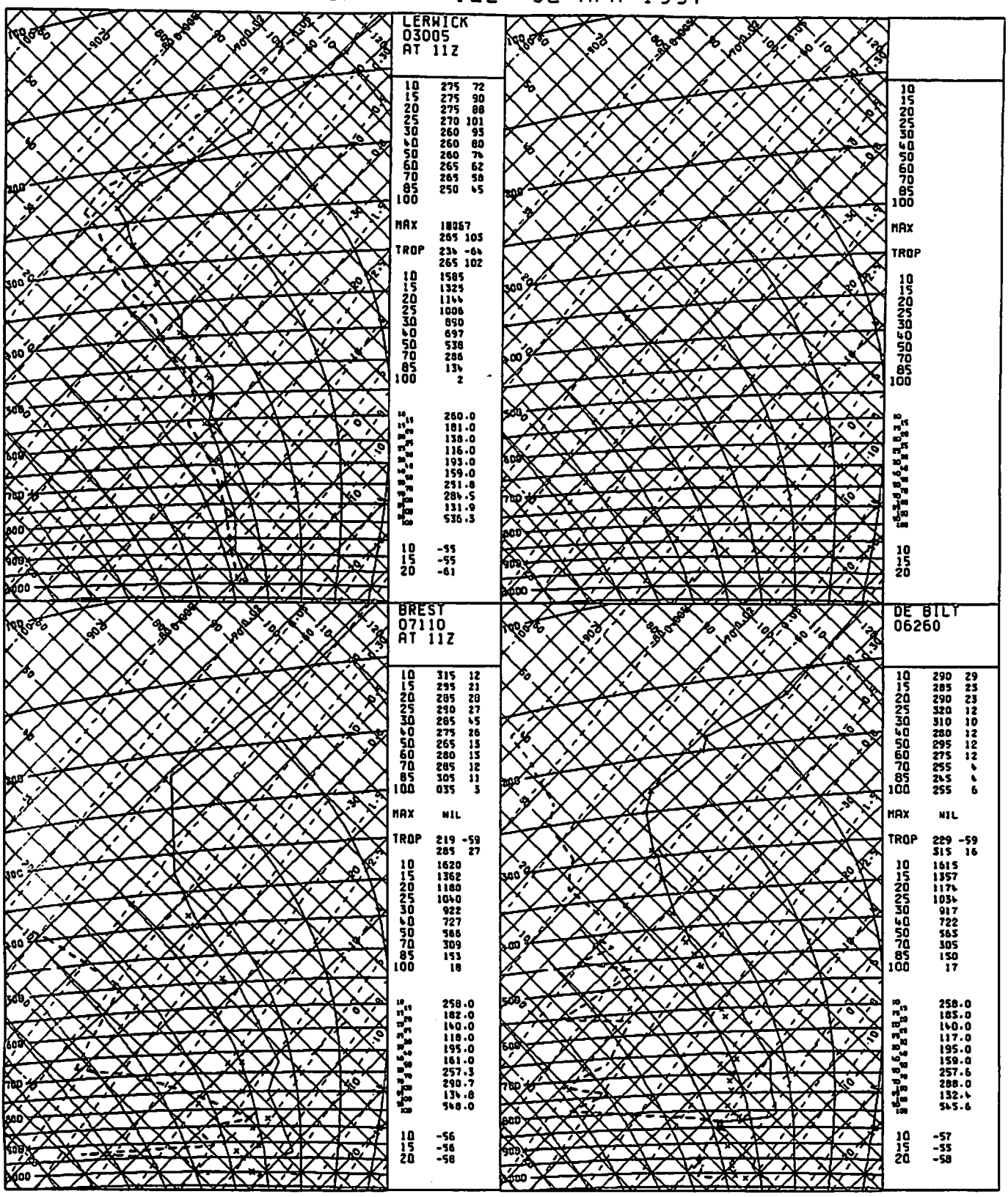
10	290	29
15	270	27
20	285	32
25	280	28
30	280	31
40	250	25
50	245	25
60	235	21
70	255	21
85	275	3
100		

MAX		NIL
TROP	218	-60
	280	22

10	1617
15	1359
20	1176
25	1036
30	917
40	723
50	562
70	305
85	150
100	17

	258.0
	183.0
	140.0
	119.0
	194.0
	161.0
	256.7
	287.9
	132.5
	544.6

10	-58
15	-54
20	-60

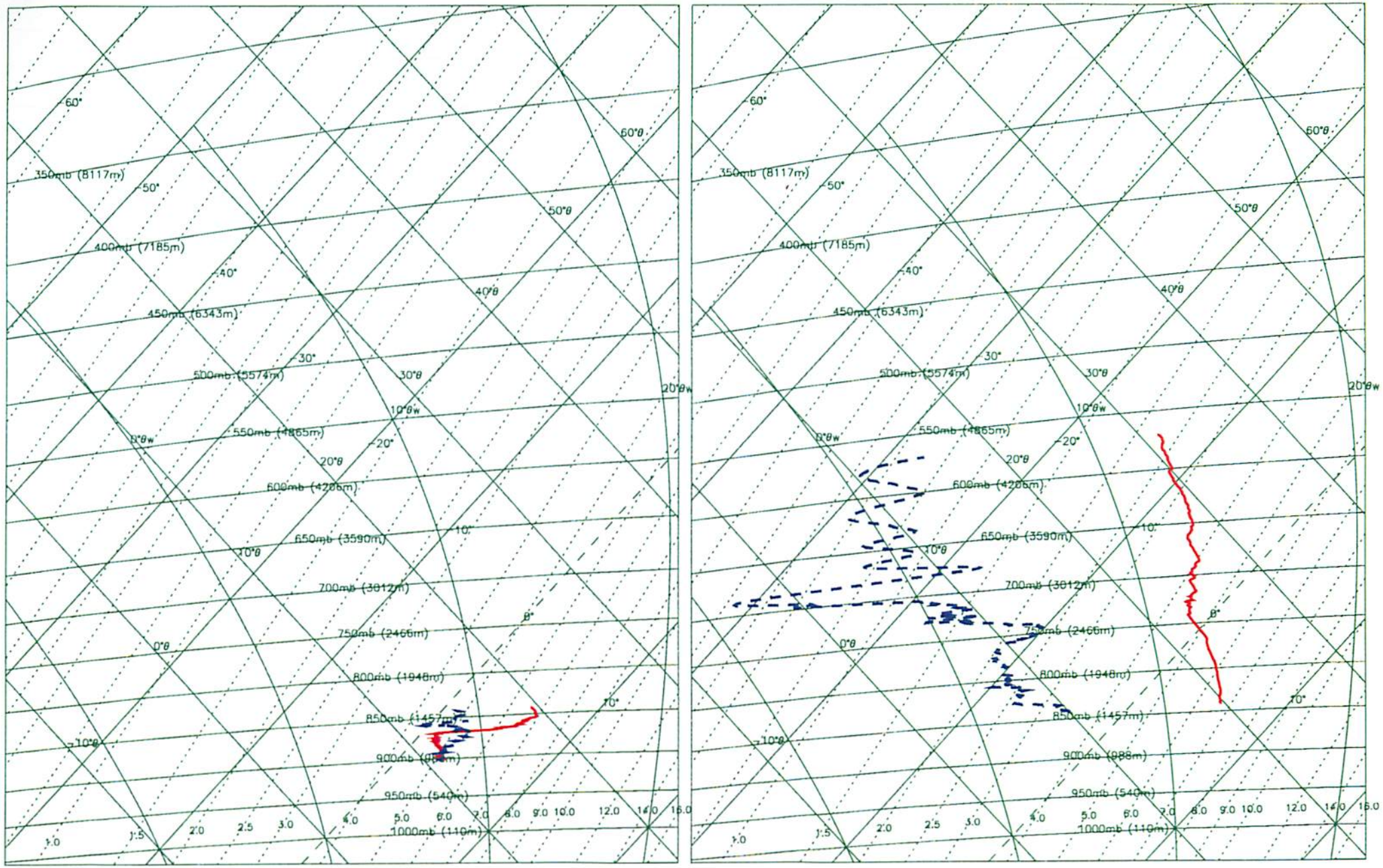

LERWICK
03005
AT 11Z
10 275 72
15 275 90
20 275 88
25 270 101
30 260 95
40 260 80
50 260 74
60 265 62
70 265 58
85 250 45
100
MAX 18867
265 105
TROP 234 -64
265 102
10 1585
15 1325
20 1144
25 1006
30 890
40 697
50 538
70 286
85 134
100 2
260.0
181.0
138.0
116.0
193.0
159.0
251.8
284.5
131.9
536.3
10 -55
15 -55
20 -61
BREST
07110
AT 11Z
10 315 12
15 295 21
20 285 28
25 290 27
30 285 45
40 275 26
50 265 15
60 280 13
70 285 12
85 305 11
100 035 3
MAX NIL
TROP 219 -59
285 27
10 1620
15 1362
20 1180
25 1040
30 922
40 727
50 586
70 389
85 153
100 18
258.0
182.0
140.0
118.0
195.0
161.0
257.3
290.7
134.8
548.0
10 -56
15 -58
20 -58
DE BILT
06260
10 290 29
15 285 23
20 290 23
25 320 12
30 310 10
40 280 12
50 295 12
60 275 12
70 255 6
85 245 6
100 255 6
MAX NIL
TROP 229 -59
315 16
10 1615
15 1357
20 1174
25 1034
30 917
40 722
50 565
70 305
85 150
100 17
258.0
185.0
140.0
117.0
195.0
159.0
257.6
288.0
132.4
545.6
10 -57
15 -55
20 -58

LIST OF FORMS USED ON FLIGHT

No. of forms	Form Title
1 1	Aircraft Scientist de-briefing sheet Aircraft Scientist log Aircraft Scientist post flight requirements sheet Interactive log
1 of 3 2 of 3 3 1	Flight Leader pre-flight check form Flight Leader in-flight check form Flight Leader in-flight log Flight Leader Video tape log (photocopy original)
	SAFIRE log CCN log MARSS log DEIMOS log Chemistry log
1	Particulate / Filter boom Operator's log 2DC / FSSP / Holography Operator's log Sonde Ejector's log Navigator's log Photographic log (photocopy original)
1 1	Instrument status forms RTD prints Raw data plots Weather charts Satellite pictures GPS track

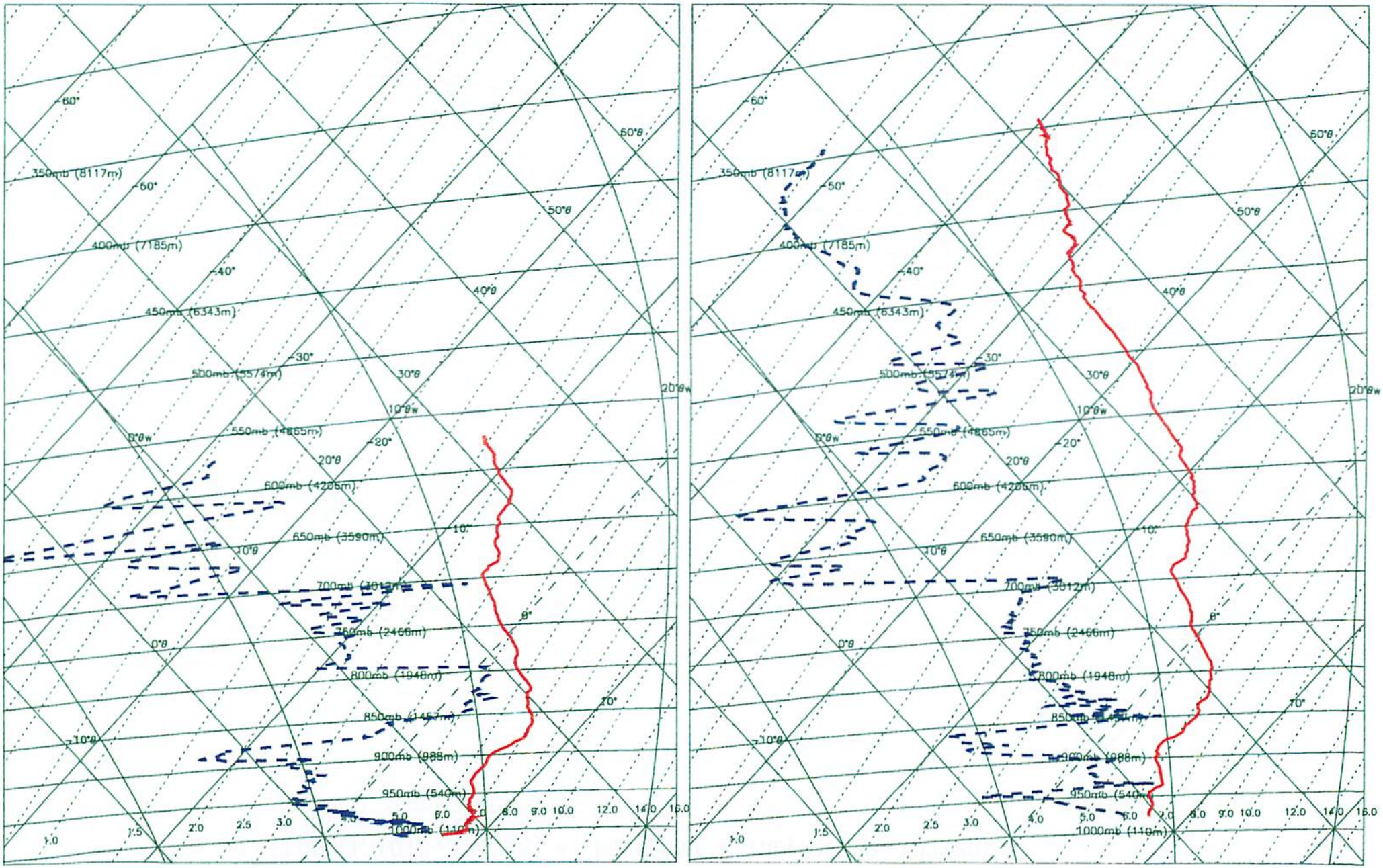
A531 02-APR-97

P1 3000'-FL050(131016-131345) + P2 FL050-FL150(132232-133220)



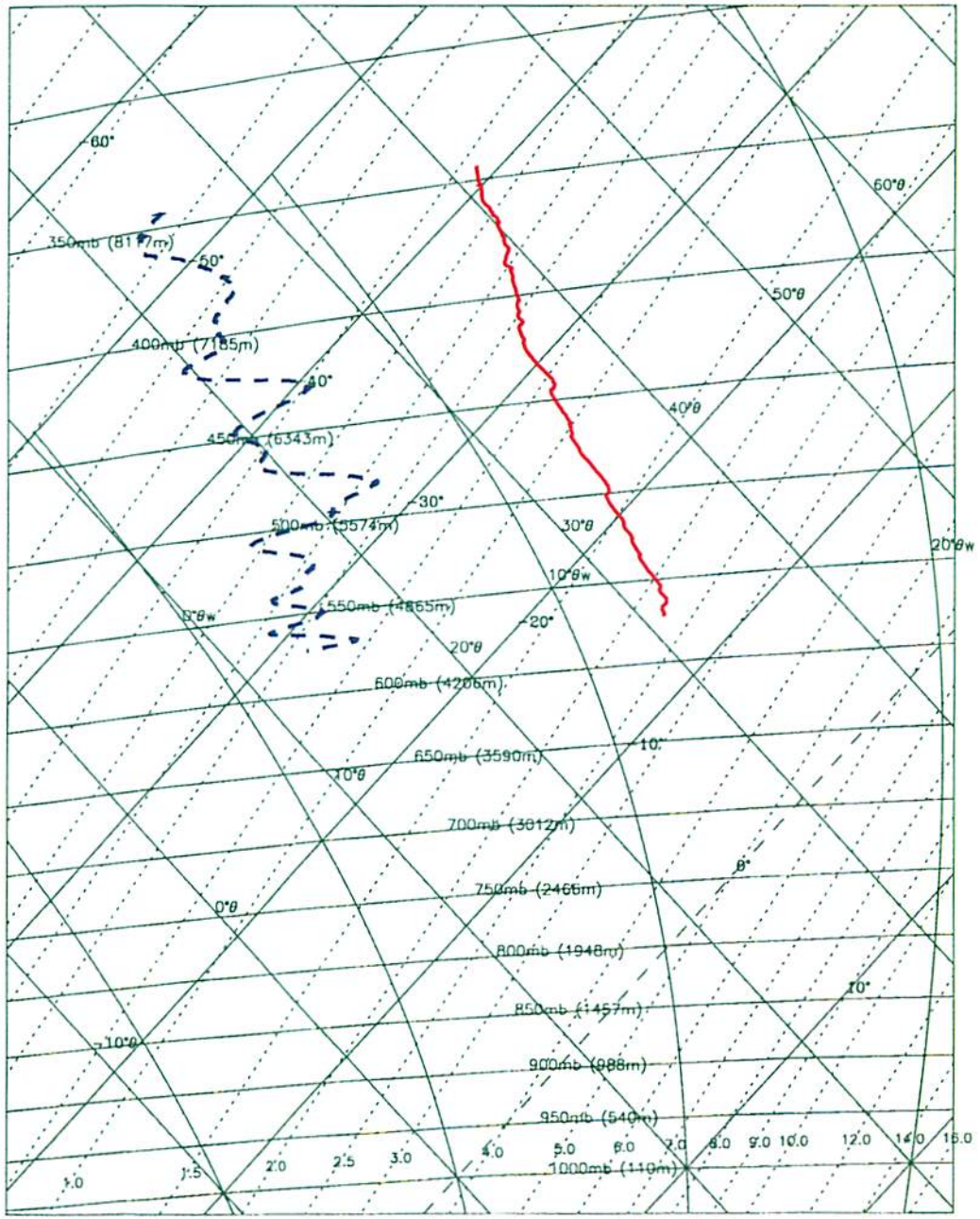
A531 02-APR-97

P3 FL150-500'(135421-141058) + P4 1100'-FL270(142711-145338)

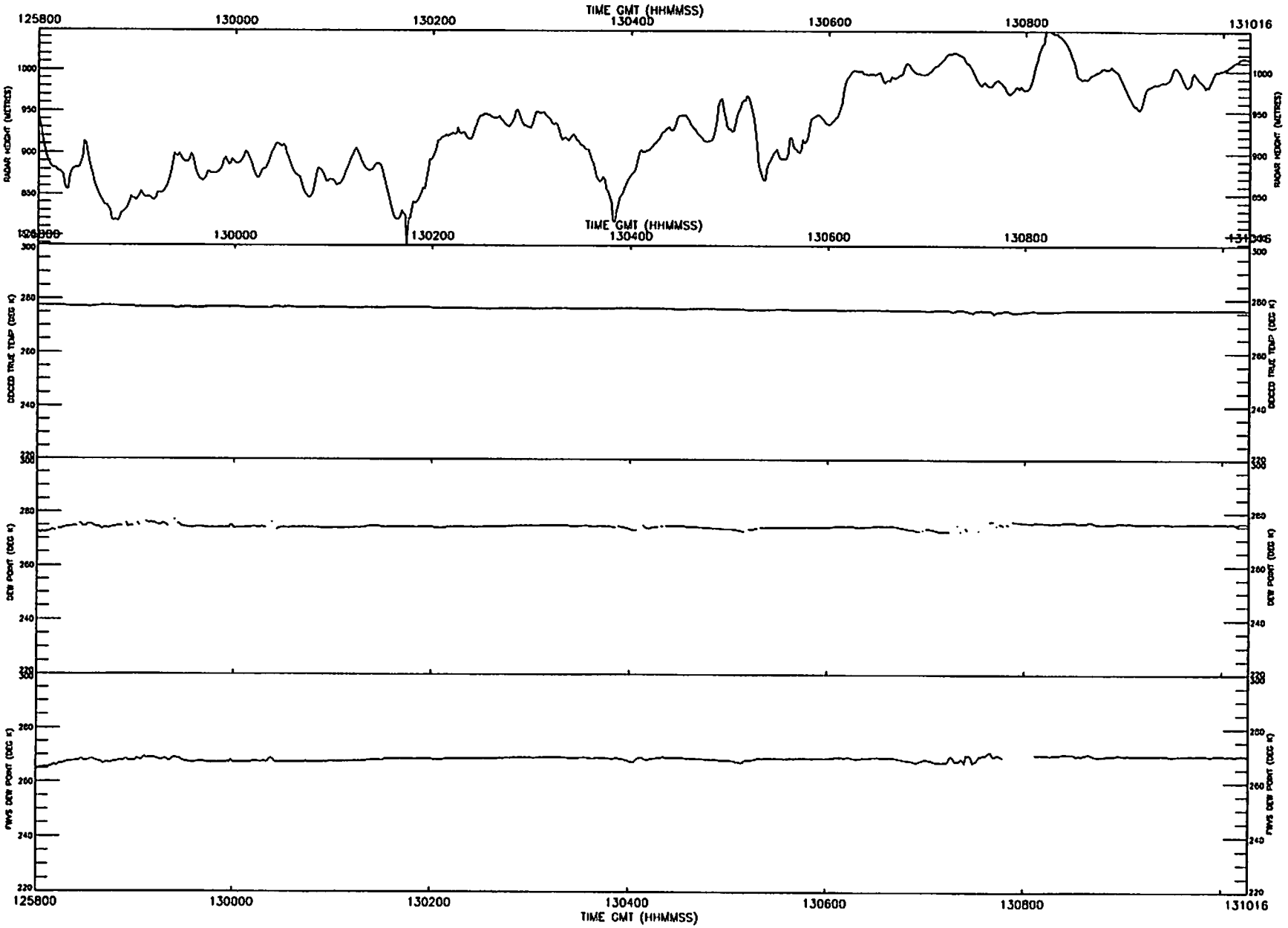


A531 02-APR-97

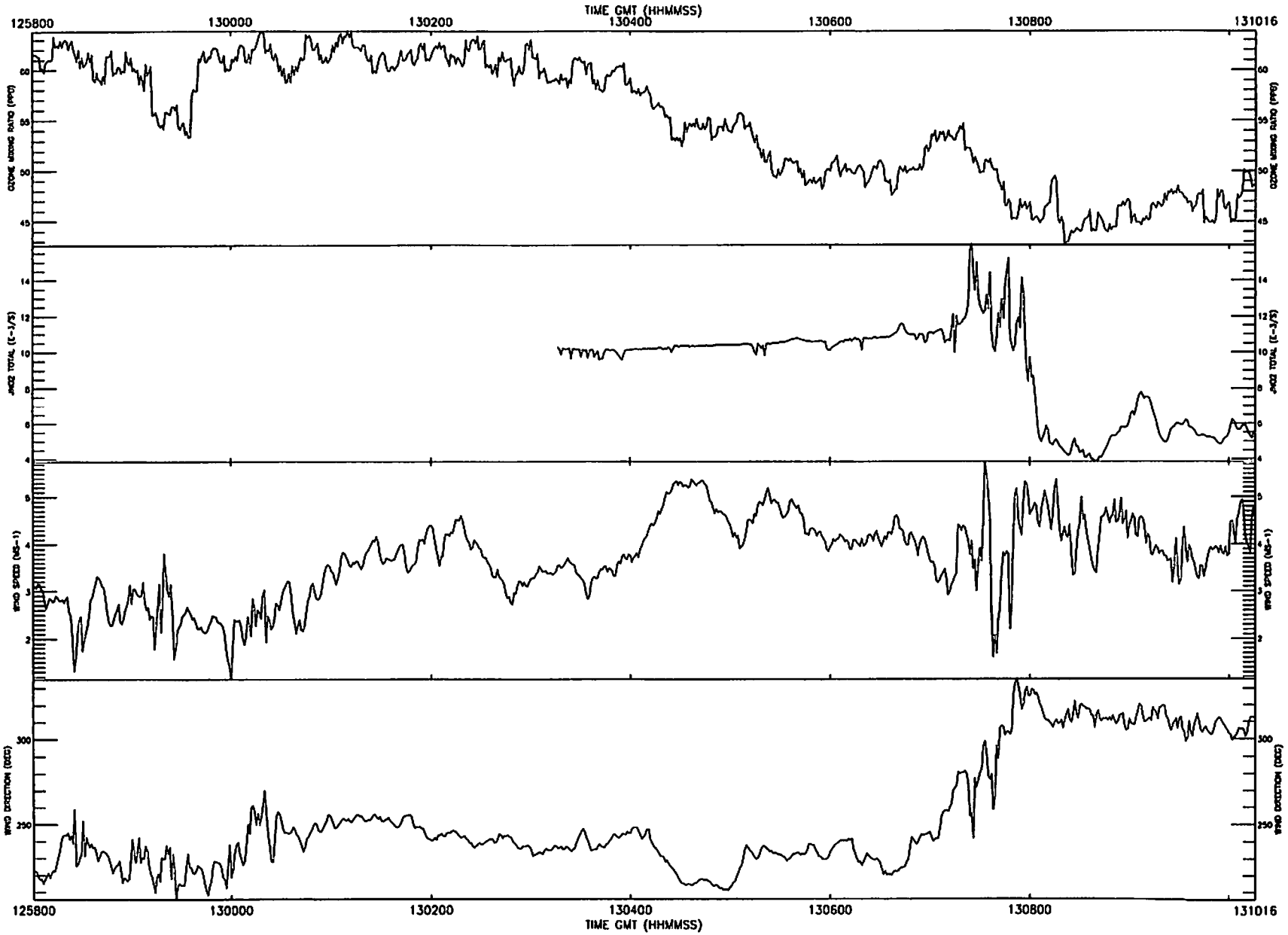
P5 FL270-FL150(151304-152507)



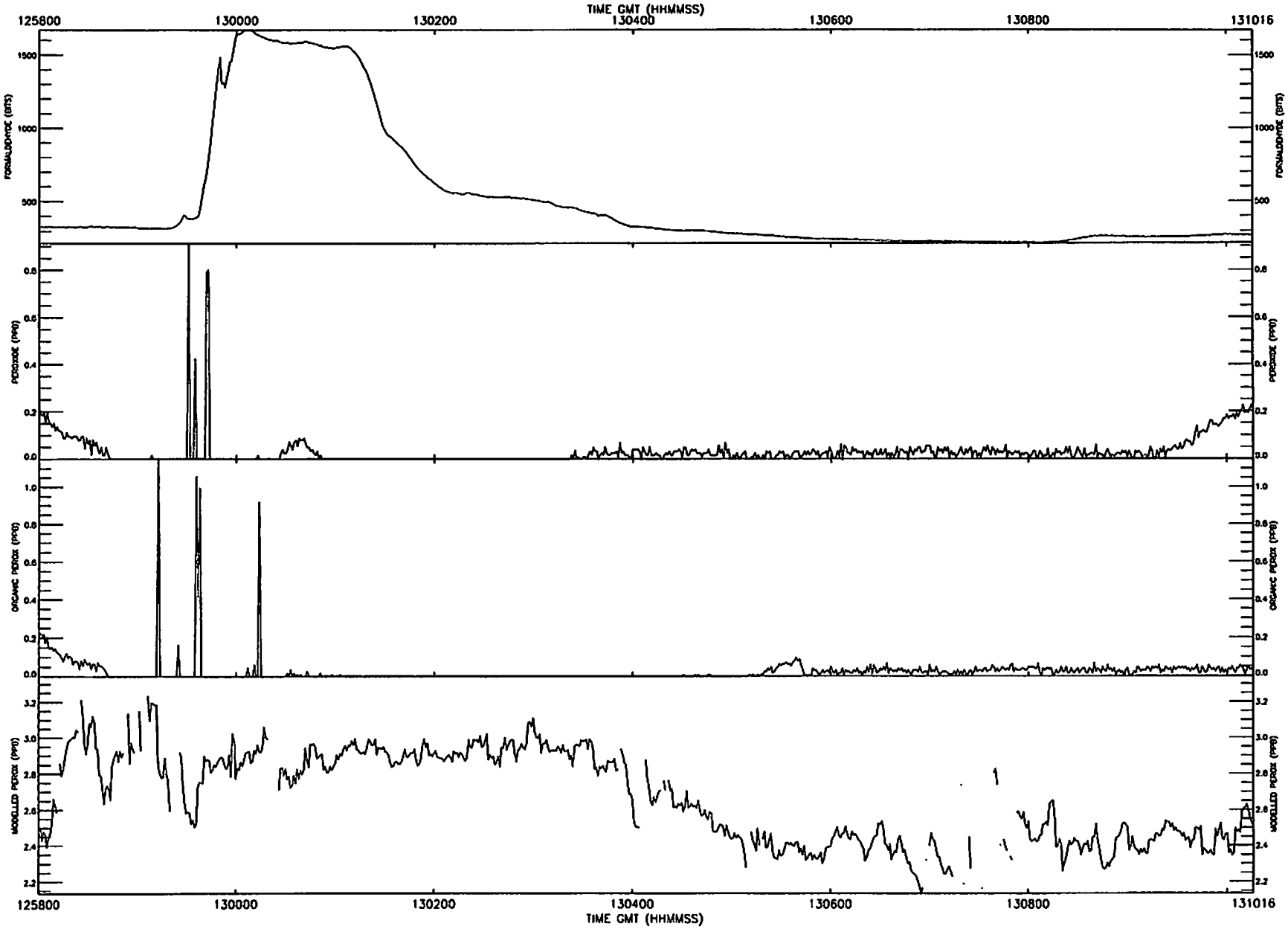
A531 02-APR-97 R1 3000' From 125800-131016 *Plotted 18-Jun-1997 09:20*



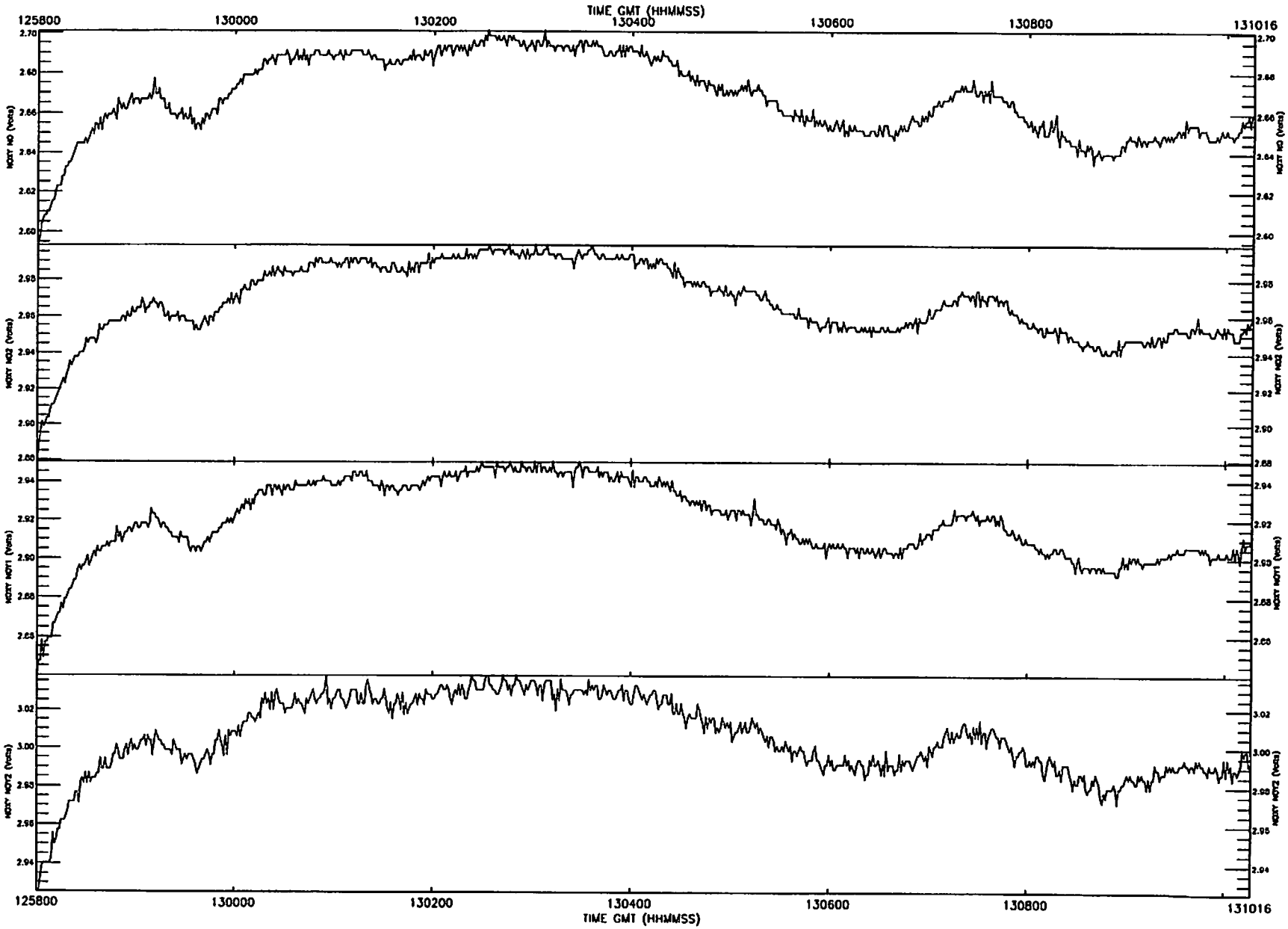
A531 02-APR-97 R1 3000' From 125800-131016 *Plotted 18-Jun-1997 09:20*



A531 02-APR-97 R1 3000' From 125800-131016 *Plotted 9-Jun-1997 16:57*



A531 02-APR-97 R1 3000' From 125800-131016 *Plotted 9-Jun-1997 16:58*



A531 02-APR-97 R1 3000' From 125800-131016 *Plotted 9-Jun-1997 16:58*

STATIC PRESSURE (MB)
No of obs 737
Mean 900.415
Standard dev 1.52309
Max value 903.879
Min value 896.797

DEICED TRUE TEMP (DEG K)
No of obs 737
Mean 276.511
Standard dev 0.490098
Max value 277.623
Min value 274.707

DEW POINT (DEG K)
No of obs 737
Mean 274.813
Standard dev 0.860523
Max value 277.214
Min value 271.905

OZONE MIXING RATIO (PPB)
No of obs 737
Mean 54.9860
Standard dev 6.15933
Max value 63.8241
Min value 42.6112

JNO2 TOTAL (E-3/S)
No of obs 737
Mean 27.4947
Standard dev 21.3500
Max value 52.4834
Min value 3.87679

PEROXIDE (PPB)
No of obs 737
Mean 3.178290e-02
Standard dev 6.845338e-02
Max value 0.912000
Min value 0.000000

RADAR HEIGHT (METRES)
No of obs 737
Mean 929.656
Standard dev 57.5518
Max value 1047.67
Min value 787.846

CORRECTED LATITUDE (DEGREES)
No of obs 737
Mean 51.0776
Standard dev 2.190052e-02
Max value 51.1155
Min value 51.0466

CORRECTED LONGITUDE (DEGREES)
No of obs 737
Mean -2.37480
Standard dev 0.277045
Max value -1.89619
Min value -2.85791

NORTHWARD WIND COMPT (M S-1)
No of obs 737
Mean 0.875776
Standard dev 2.11088
Max value 4.47255
Min value -4.67893

EASTWARD WIND COMPT (M S-1)
No of obs 737
Mean 2.92899
Standard dev 0.721941
Max value 5.08736
Min value 0.730125

VERTICAL WIND COMPT (M S-1)
No of obs 737
Mean 4.835214e-02
Standard dev 0.713172
Max value 3.77525
Min value -2.02316

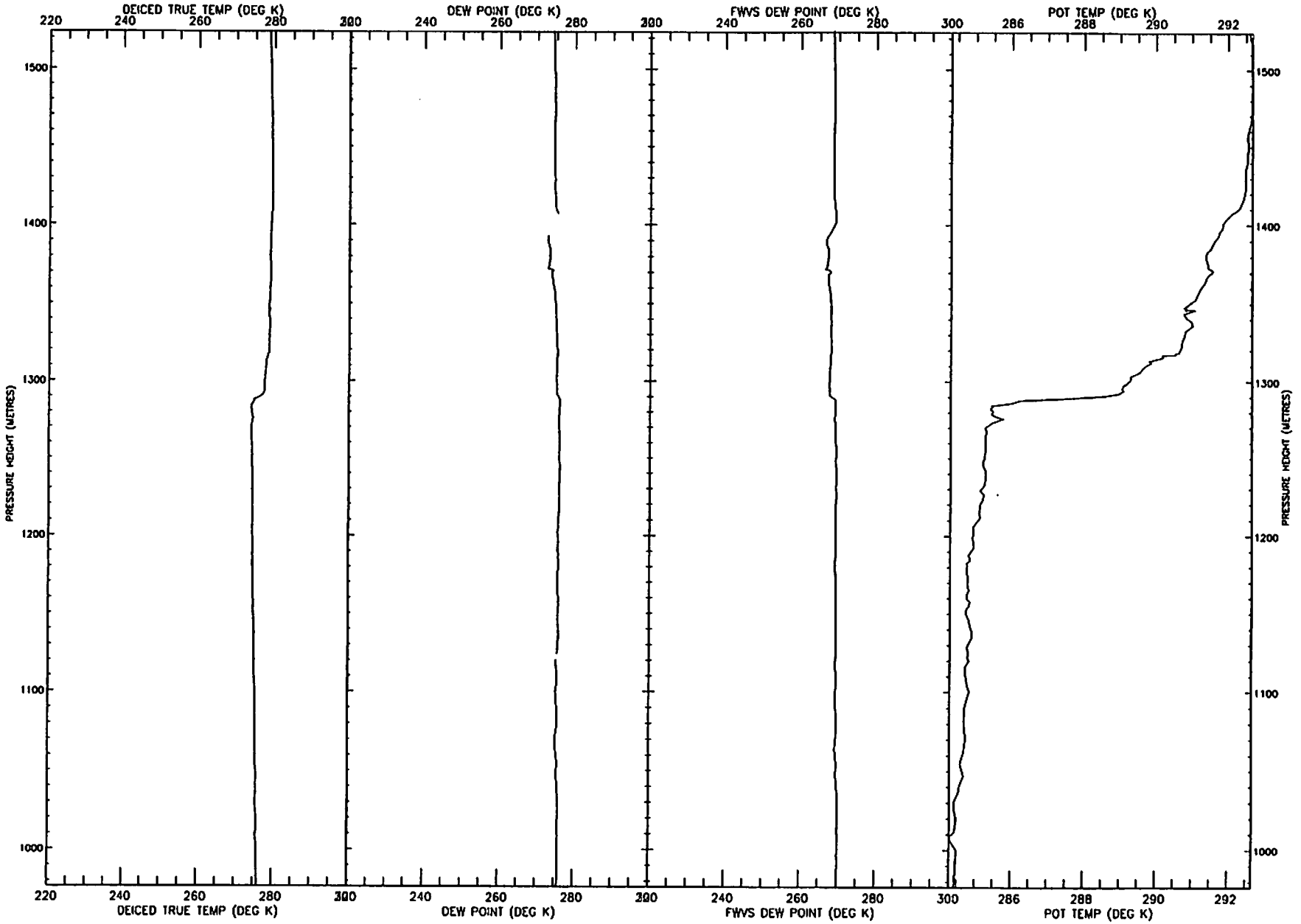
WIND SPEED (MS-1)
No of obs 737
Mean 3.68517
Standard dev 0.858307
Max value 5.75515
Min value 1.15004

WIND DIRECTION (DEG)
Mean 253.353

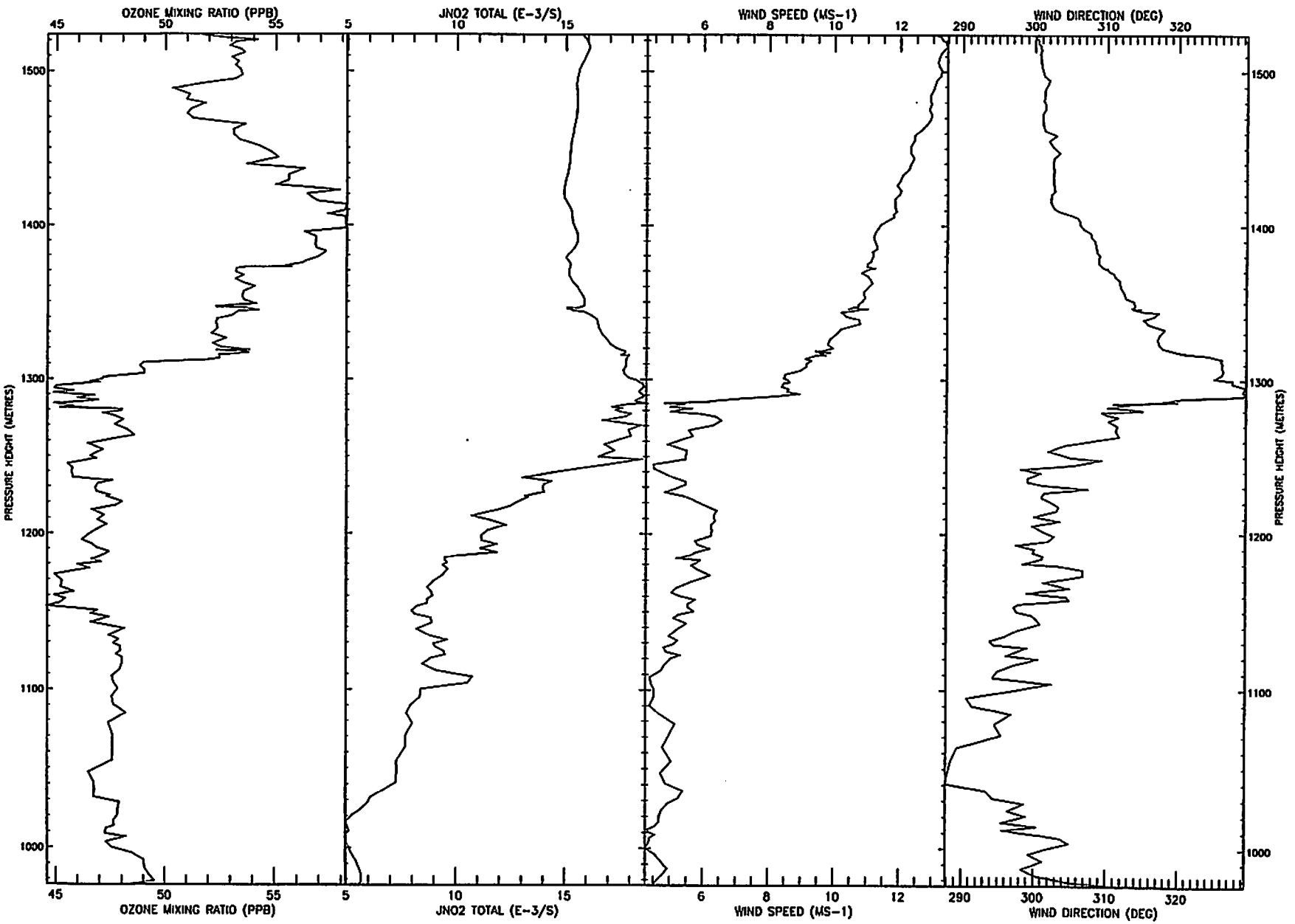
TRUE AIR SPEED (M S-1)
No of obs 737
Mean 95.6215
Standard dev 1.55214
Max value 99.9229
Min value 90.1457

HEADING (DEG)
Mean 263.520

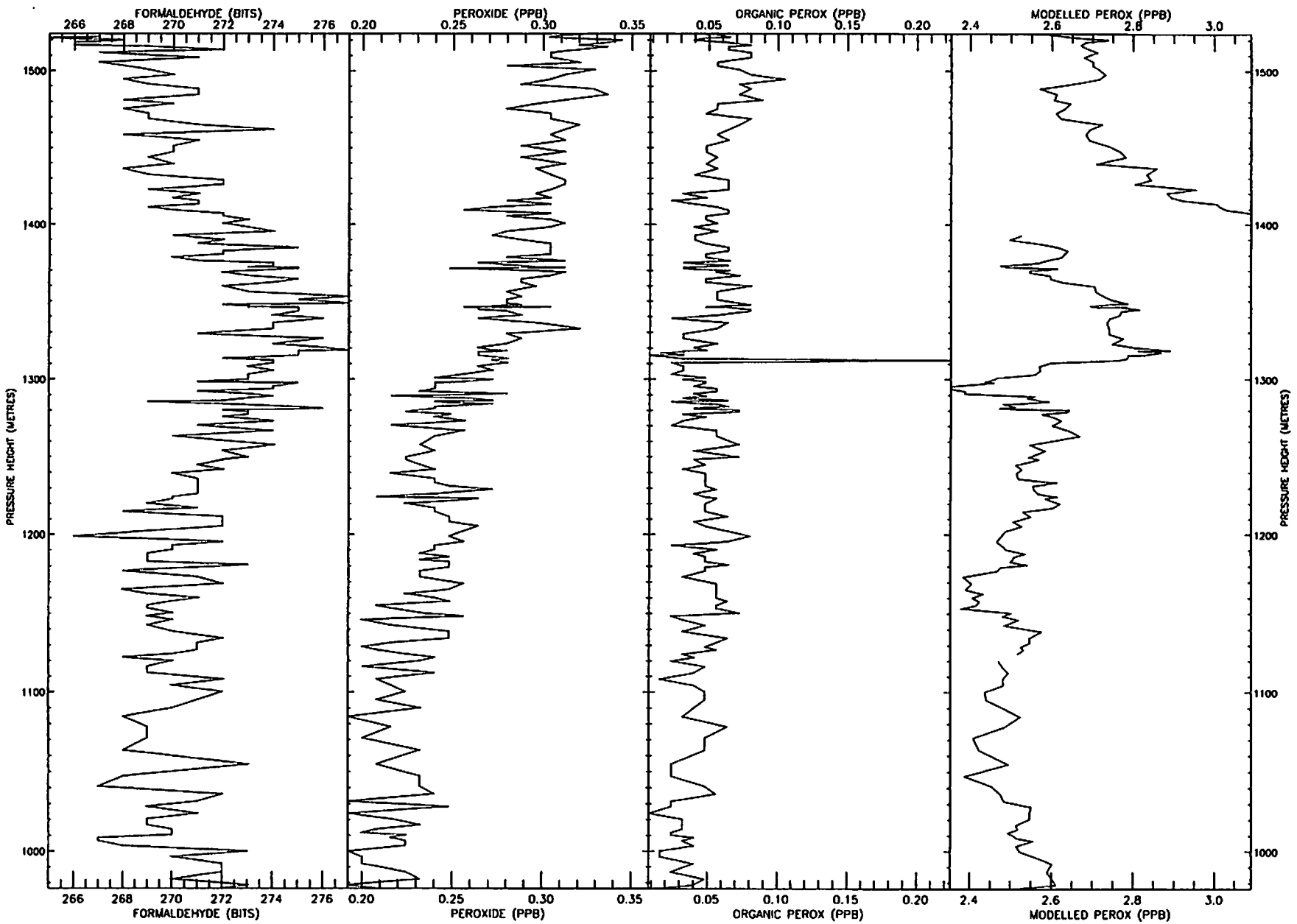
A531 02-APR-97 P1 3000'-FL050 From 131016-131345 *Plotted 18-Jun-1997 09:21*



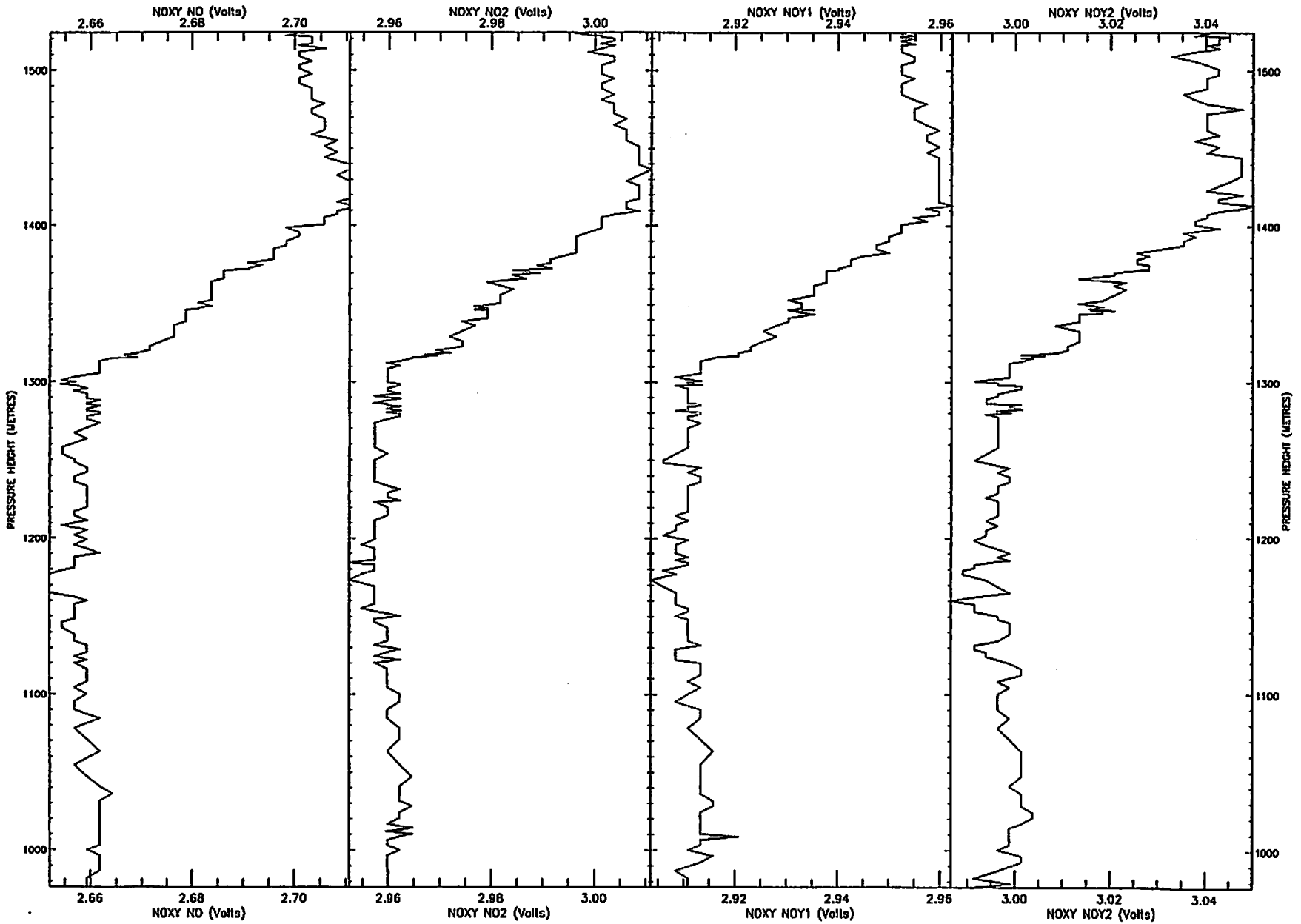
A531 02-APR-97 P1 3000'-FL050 From 131016-131345 *Plotted 18-Jun-1997 09:21*



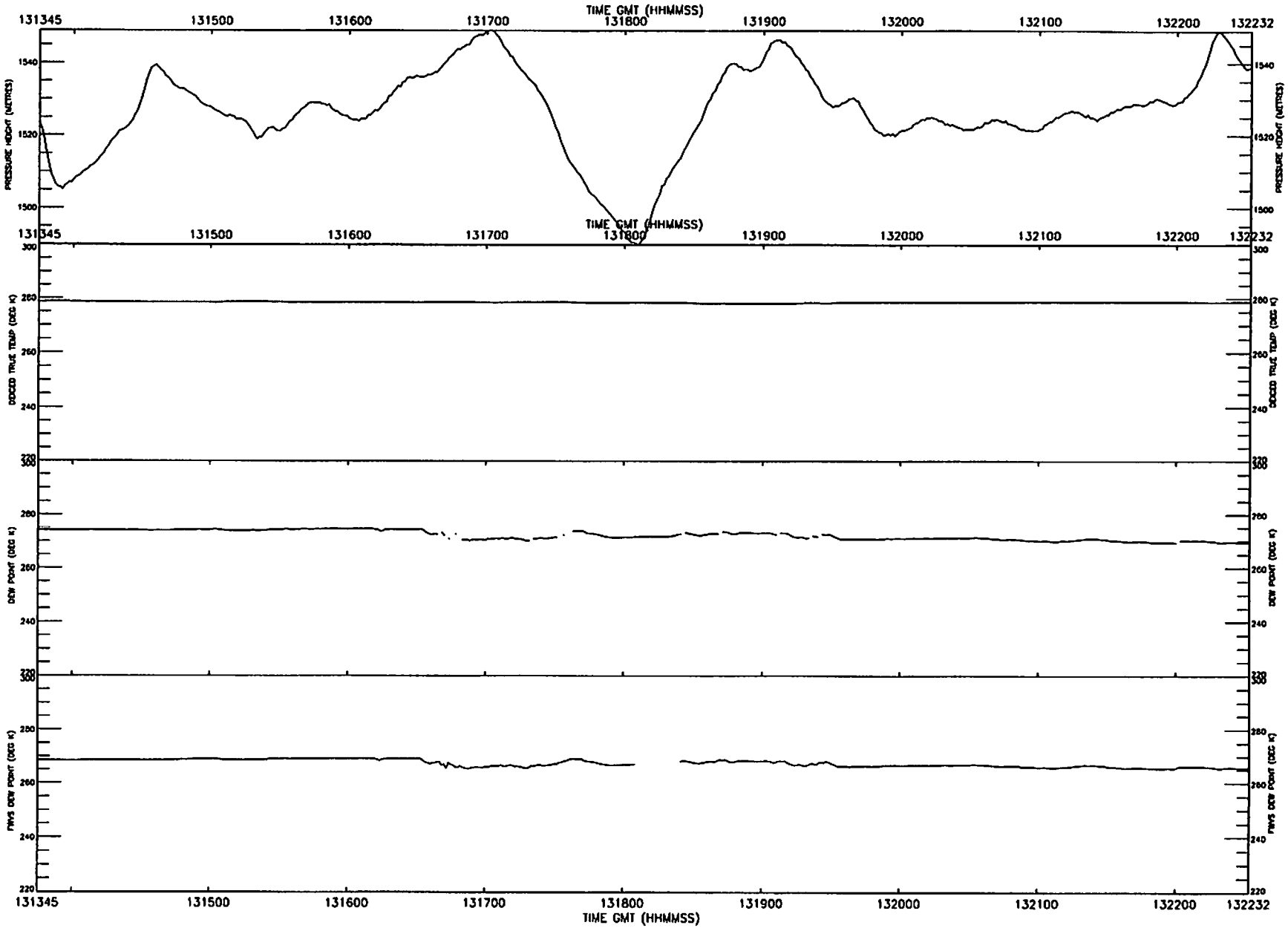
A531 02-APR-97 P1 3000'-FL050 From 131016-131345 *Plotted 9-Jun-1997 16:59*



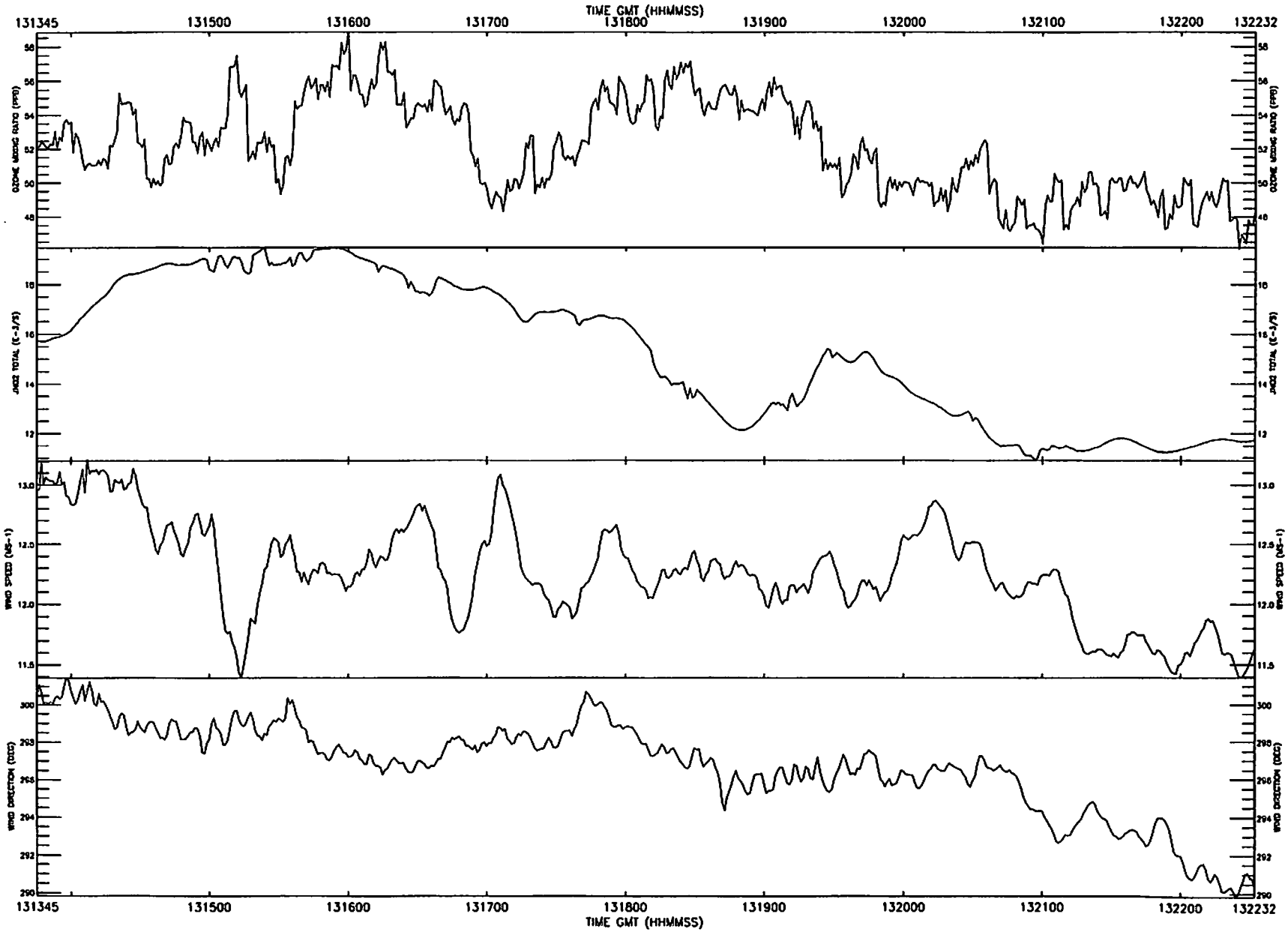
A531 02-APR-97 P1 3000'-FL050 From 131016-131345 *Plotted 9-Jun-1997 16:59*



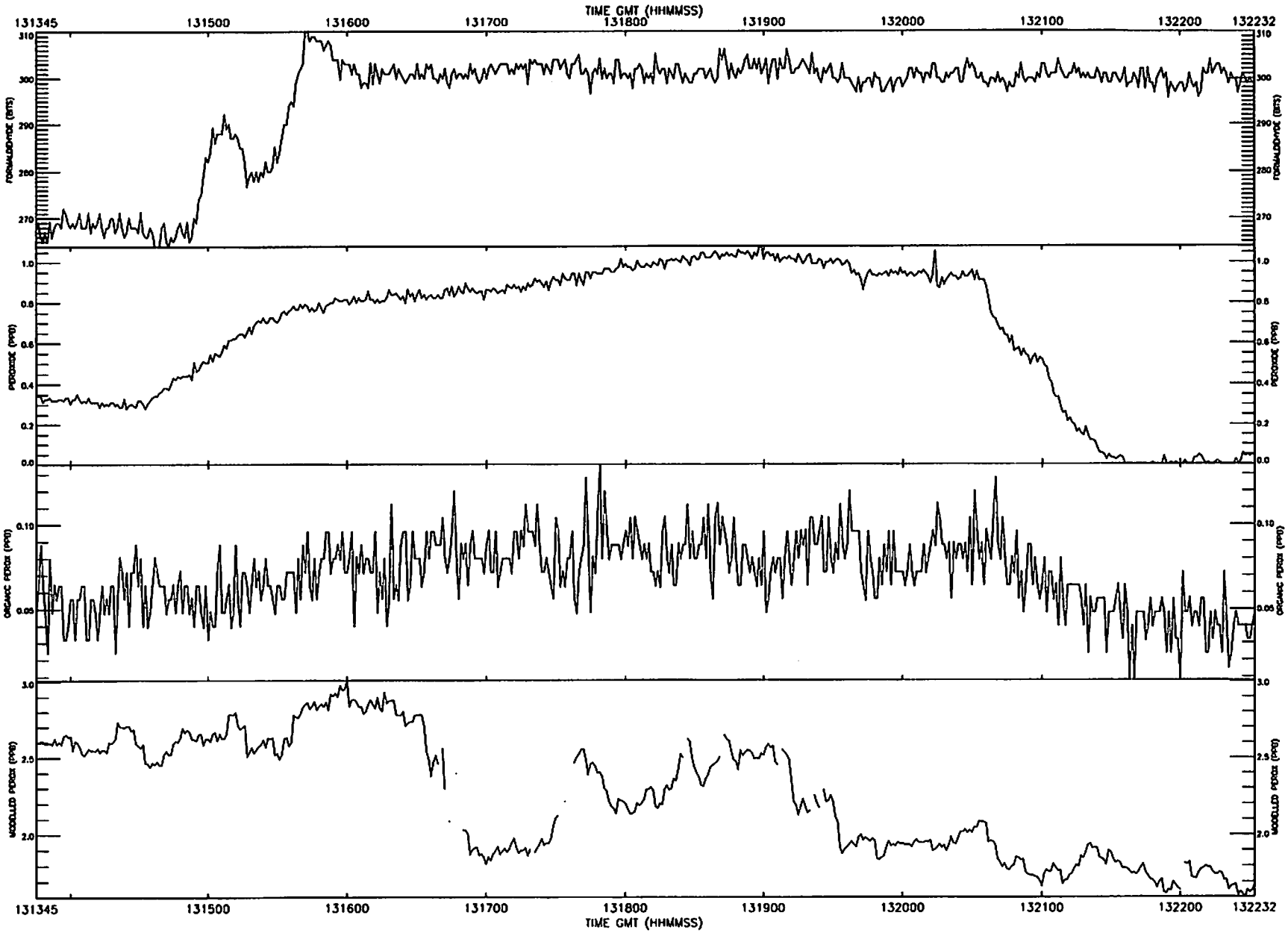
A531 02-APR-97 R2 FL050 From 131345-132232 *Plotted 18-Jun-1997 09:23*



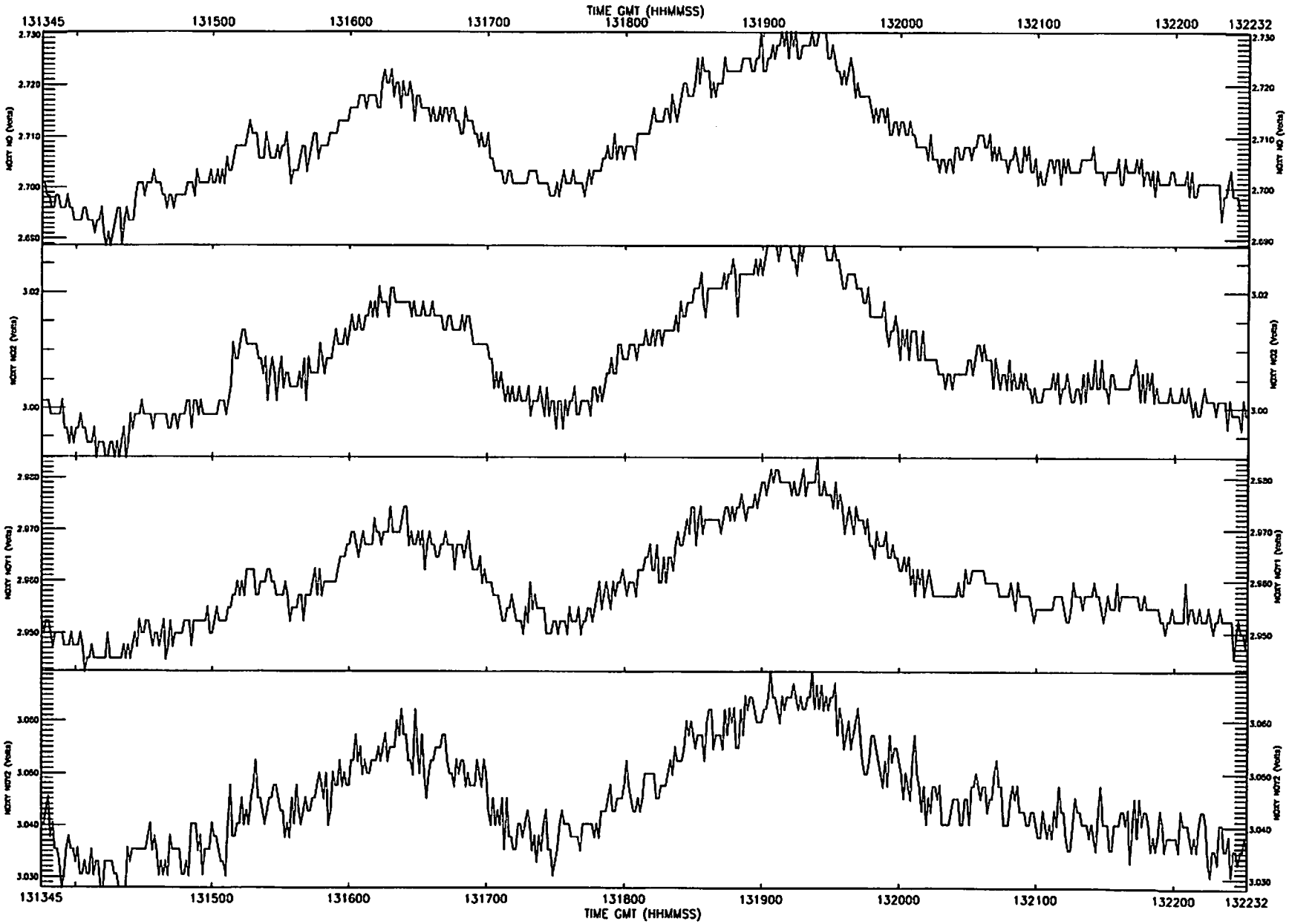
A531 02-APR-97 R2 FL050 From 131345-132232 *Plotted 18-Jun-1997 09:23*



A531 02-APR-97 R2 FL050 From 131345-132232 *Plotted 9-Jun-1997 17:02*



A531 02-APR-97 R2 FL050 From 131345-132232 *Plotted 9-Jun-1997 17:02*



A531 02-APR-97 R2 FL050 From 131345-132232 *Plotted 9-Jun-1997 17:02*

STATIC PRESSURE (MB)
No of obs 528
Mean 842.813
Standard dev 1.25072
Max value 846.605
Min value 840.498

DEICED TRUE TEMP (DEG K)
No of obs 528
Mean 278.559
Standard dev 0.169249
Max value 278.818
Min value 278.105

DEW POINT (DEG K)
No of obs 528
Mean 272.165
Standard dev 1.66074
Max value 274.555
Min value 269.368

OZONE MIXING RATIO (PPB)
No of obs 528
Mean 52.0930
Standard dev 2.77449
Max value 58.8132
Min value 46.1659

JNO2 TOTAL (E-3/S)
No of obs 528
Mean 15.4839
Standard dev 2.89477
Max value 19.7023
Min value 11.0199

PEROXIDE (PPB)
No of obs 528
Mean 0.661682
Standard dev 0.347698
Max value 1.08000
Min value 0.000000

PRESSURE HEIGHT (METRES)
No of obs 528
Mean 1526.49
Standard dev 12.0809
Max value 1548.88
Min value 1489.91

CORRECTED LATITUDE (DEGREES)
No of obs 528
Mean 51.0030
Standard dev 1.623058e-02
Max value 51.0305
Min value 50.9753

CORRECTED LONGITUDE (DEGREES)
No of obs 528
Mean -3.45954
Standard dev 0.192235
Max value -3.12882
Min value -3.79213

NORTHWARD WIND COMPT (M S-1)
No of obs 528
Mean -5.52923
Standard dev 0.606094
Max value -3.89214
Min value -6.79025

EASTWARD WIND COMPT (M S-1)
No of obs 528
Mean 10.9375
Standard dev 0.277651
Max value 11.5375
Min value 9.97136

VERTICAL WIND COMPT (M S-1)
No of obs 528
Mean 0.234332
Standard dev 0.409770
Max value 1.05538
Min value -0.706833

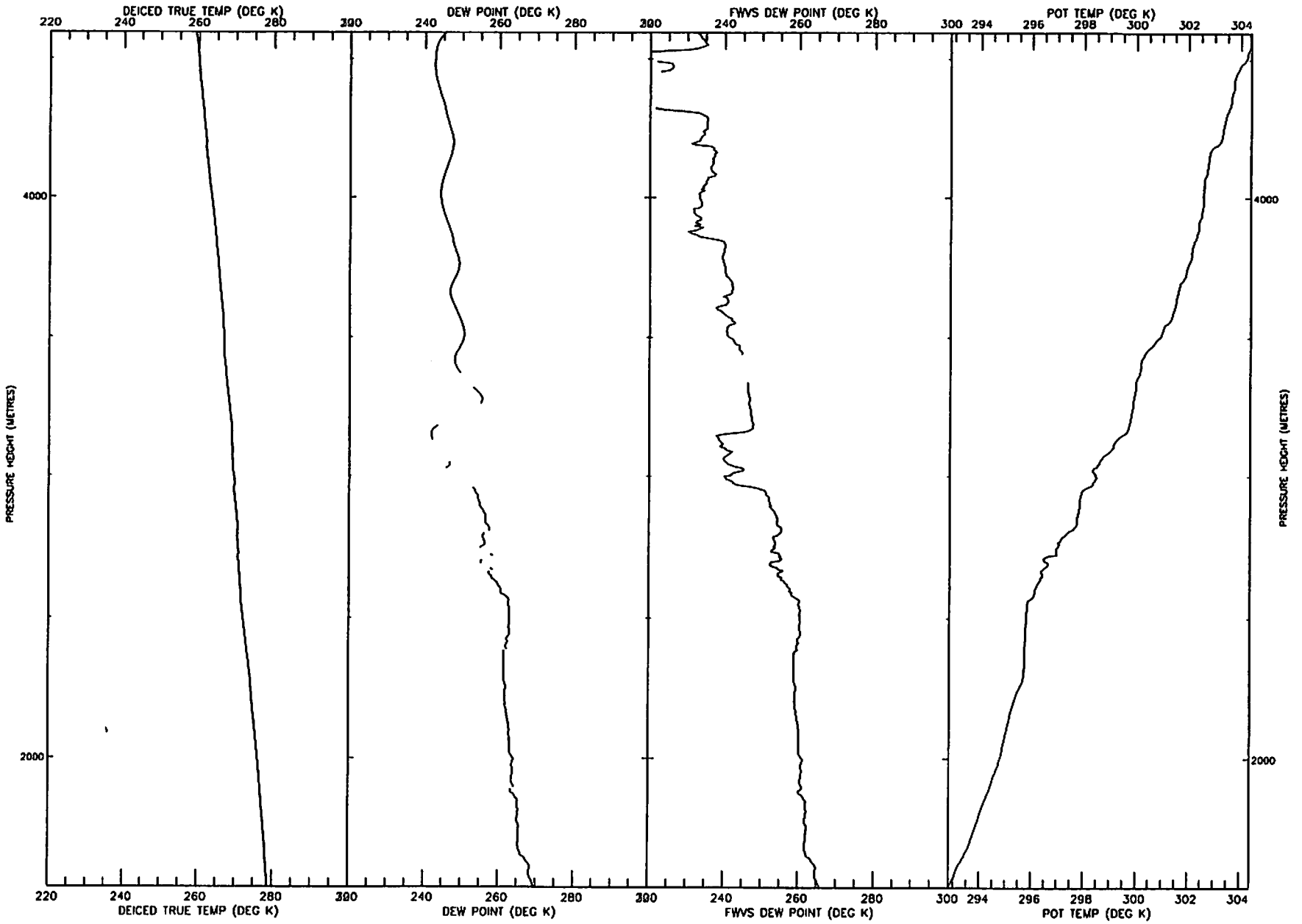
WIND SPEED (MS-1)
No of obs 528
Mean 12.2667
Standard dev 0.415904
Max value 13.2034
Min value 11.3902

WIND DIRECTION (DEG)
Mean 296.818

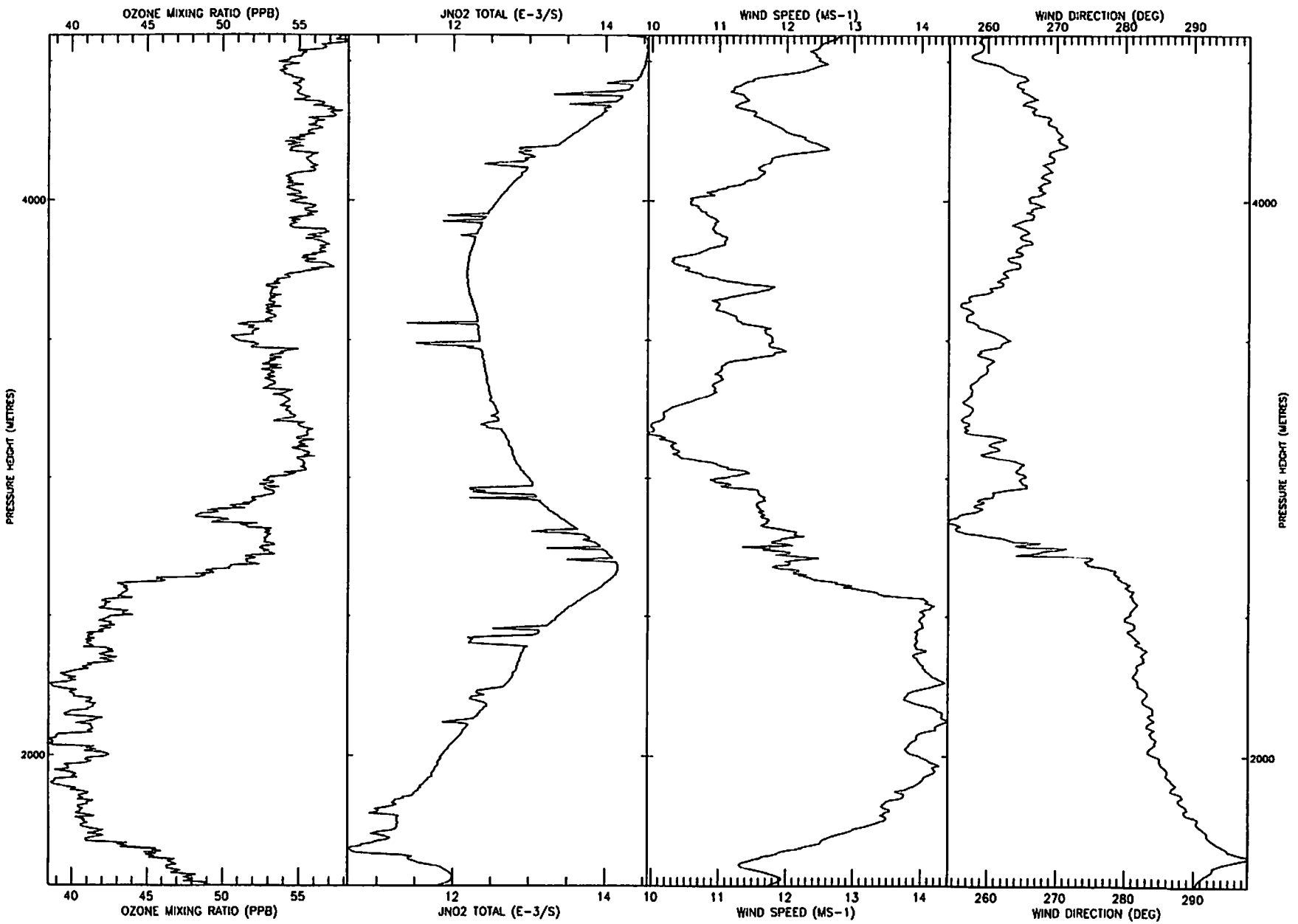
TRUE AIR SPEED (M S-1)
No of obs 528
Mean 99.2470
Standard dev 1.39410
Max value 102.231
Min value 94.9569

HEADING (DEG)
Mean 262.490

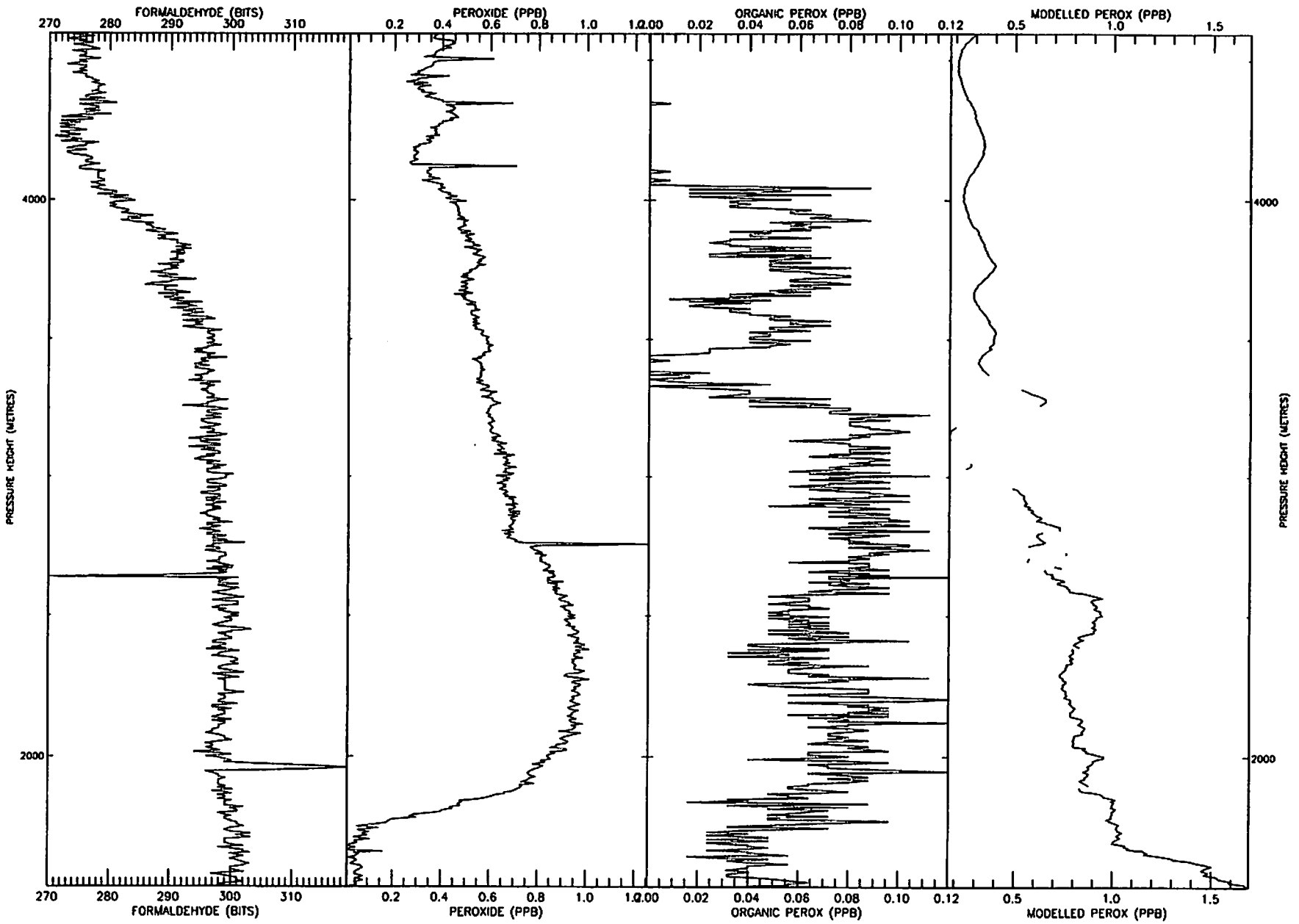
A531 02-APR-97 P2 FL050-FL150 From 132232-133220 *Plotted 18-Jun-1997 09:25*



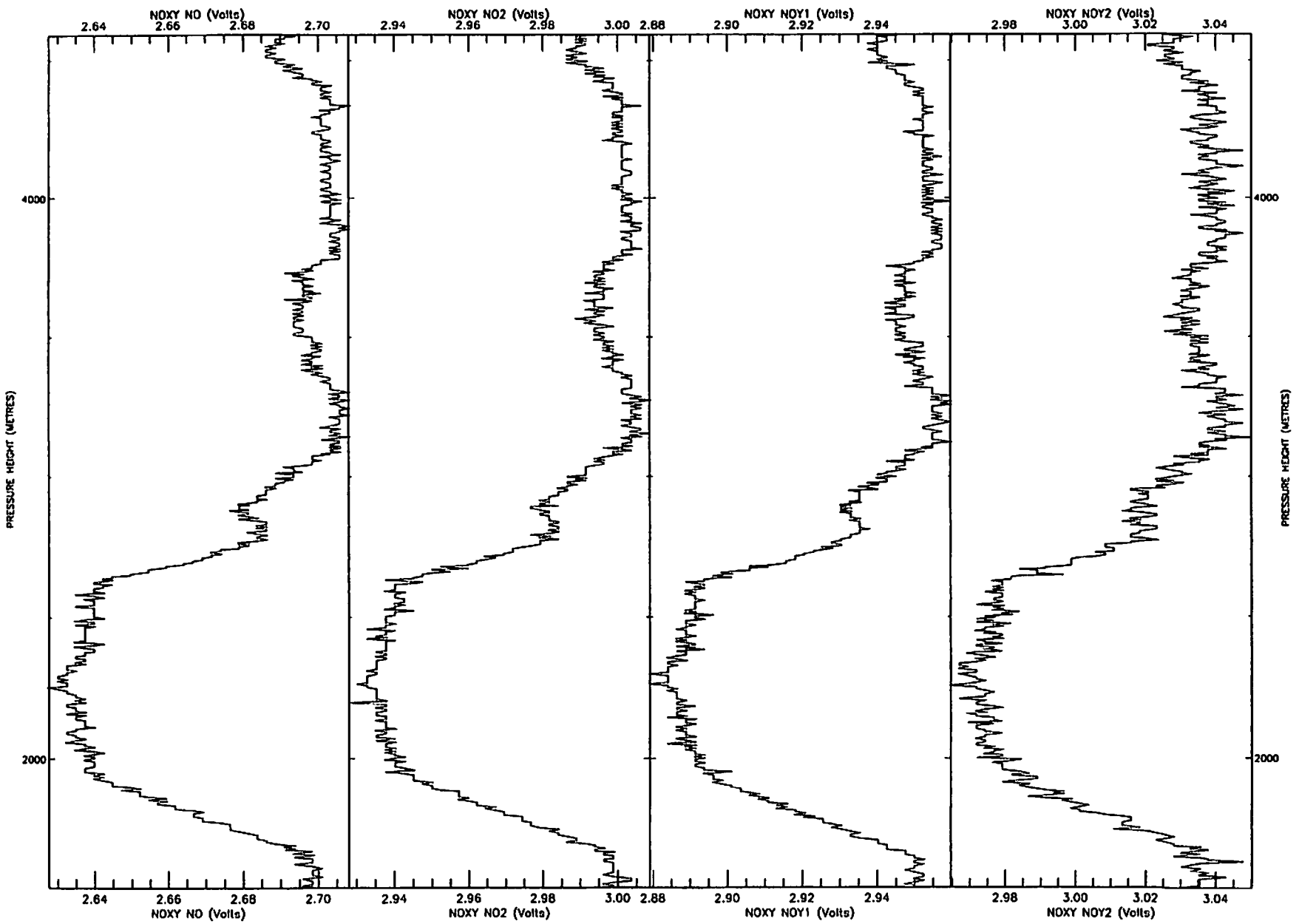
A531 02-APR-97 P2 FL050-FL150 From 132232-133220 *Plotted 18-Jun-1997 09:25*



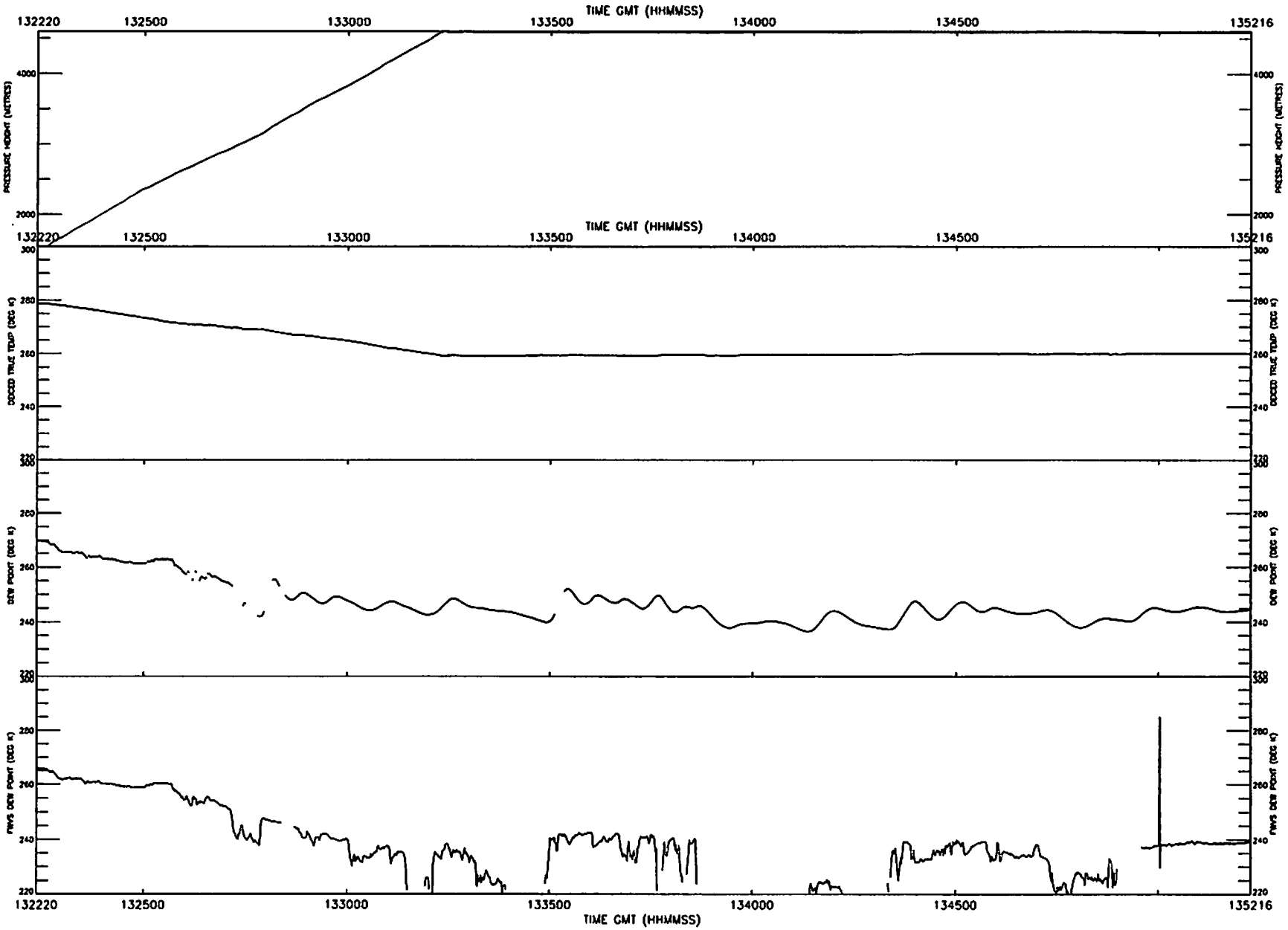
A531 02-APR-97 P2 FL050-FL150 From 132232-133220 *Plotted 9-Jun-1997 17:06*



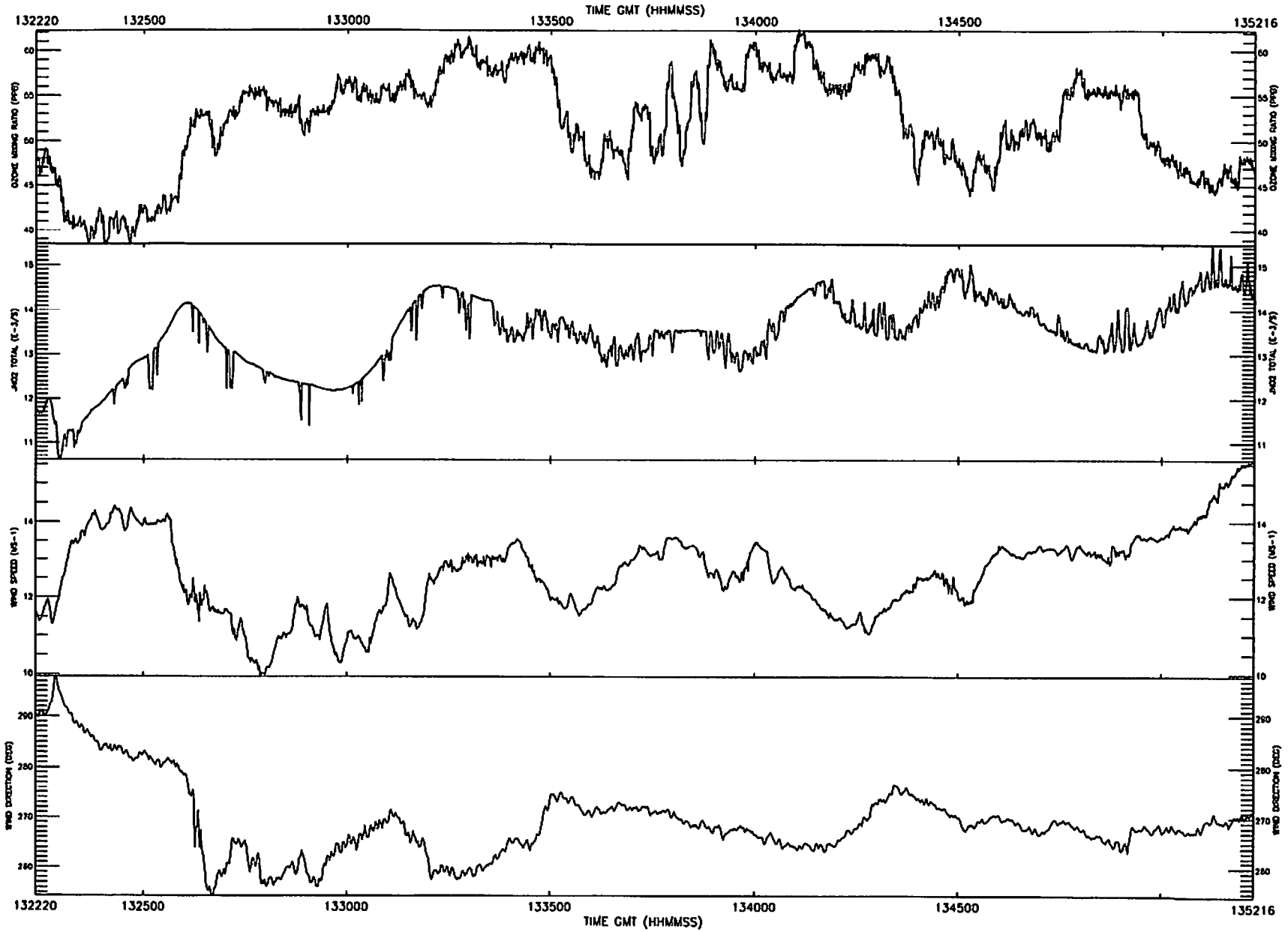
A531 02-APR-97 P2 FL050-FL150 From 132232-133220 *Plotted 9-Jun-1997 17:06*



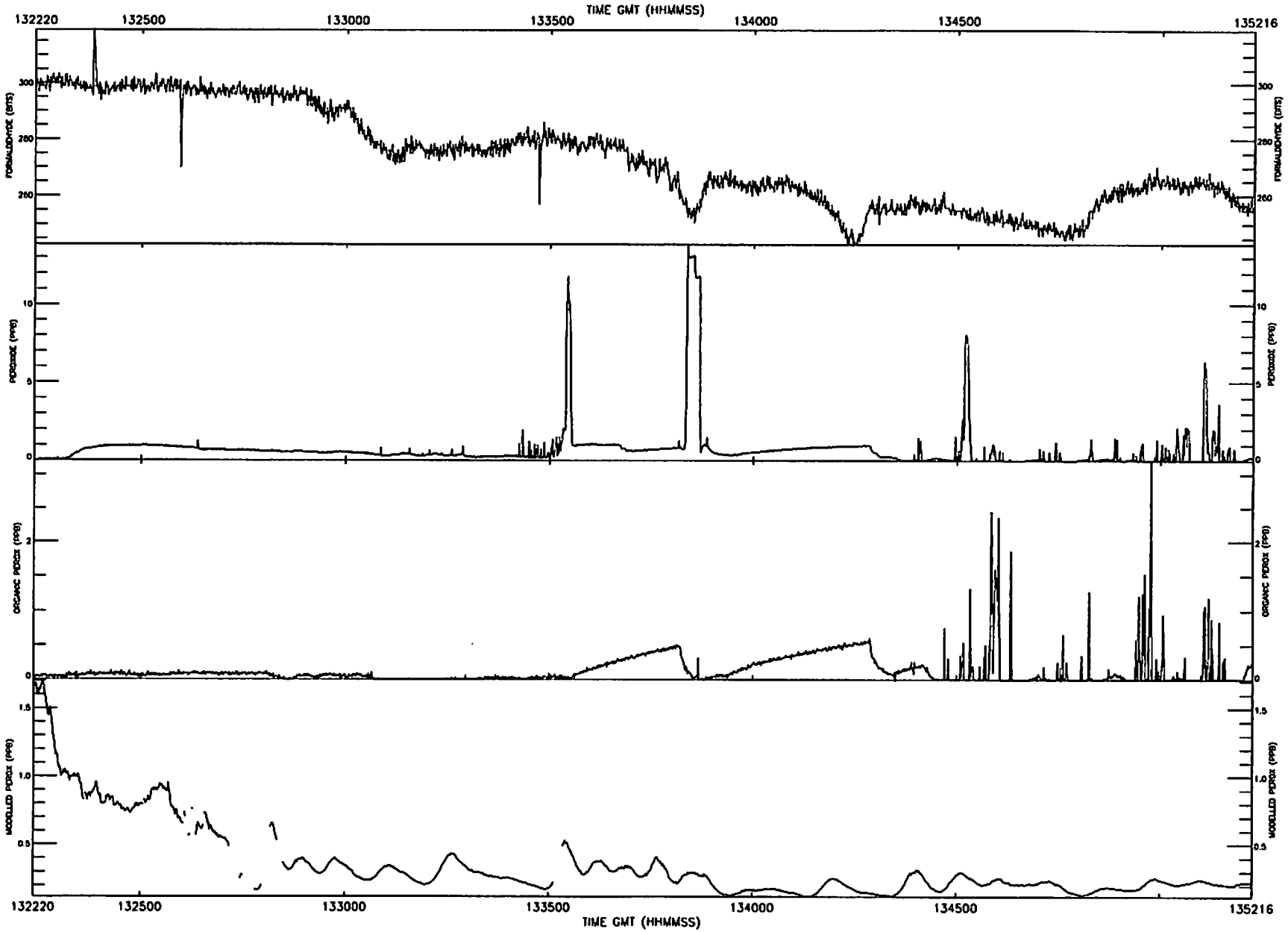
A531 02-APR-97 R3 FL150 From 132220-135216 *Plotted 18-Jun-1997 09:28*



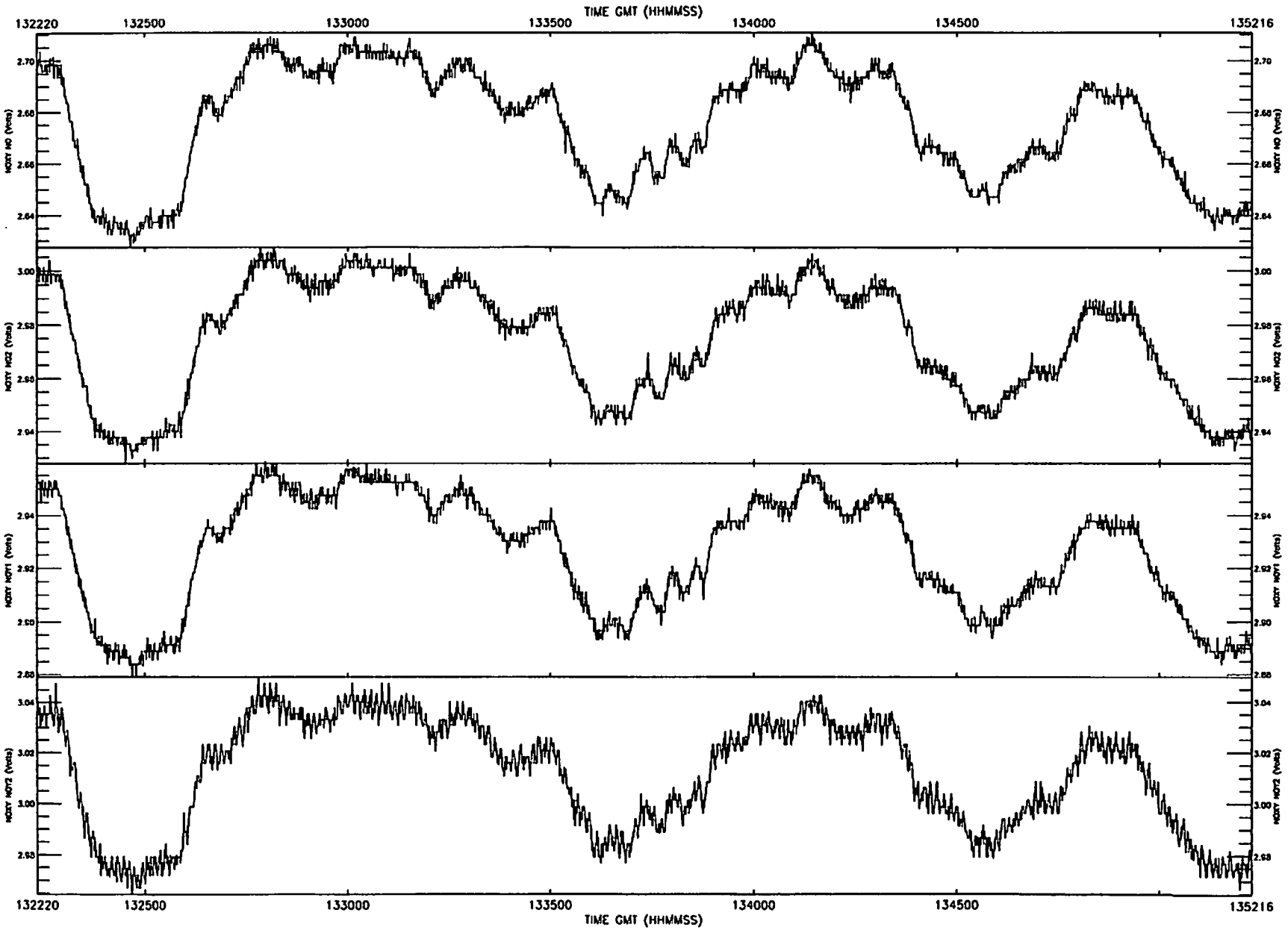
A531 02-APR-97 R3 FL150 From 132220-135216 *Plotted 18-Jun-1997 09:28*



A531 02-APR-97 R3 FL150 From 132220-135216 *Plotted 9-Jun-1997 17:13*



A531 02-APR-97 R3 FL150 From 132220-135216 *Plotted 9-Jun-1997 17:13*



A531 02-APR-97 R3 FL150 From 132220-135216 *Plotted 9-Jun-1997 17:14*

STATIC PRESSURE (MB)
No of obs 1797
Mean 614.614
Standard dev 76.4798
Max value 841.570
Min value 570.002

DEICED TRUE TEMP (DEG K)
No of obs 1797
Mean 262.956
Standard dev 5.58189
Max value 278.742
Min value 259.101

DEW POINT (DEG K)
No of obs 1797
Mean 246.913
Standard dev 7.53594
Max value 269.781
Min value 236.484

OZONE MIXING RATIO (PPB)
No of obs 1797
Mean 52.1294
Standard dev 5.56713
Max value 62.2181
Min value 38.4489

JNO2 TOTAL (E-3/S)
No of obs 1797
Mean 13.3740
Standard dev 0.830431
Max value 15.4452
Min value 10.7431

PEROXIDE (PPB)
No of obs 1797
Mean 0.706155
Standard dev 1.50952
Max value 13.8480
Min value 0.000000

PRESSURE HEIGHT (METRES)
No of obs 1797
Mean 4065.58
Standard dev 890.369
Max value 4596.00
Min value 1538.50

CORRECTED LATITUDE (DEGREES)
No of obs 1797
Mean 50.9163
Standard dev 3.379698e-02
Max value 50.9764
Min value 50.8544

CORRECTED LONGITUDE (DEGREES)
No of obs 1797
Mean -5.03358
Standard dev 0.750512
Max value -3.77668
Min value -6.33842

NORTHWARD WIND COMPT (M S-1)
No of obs 1797
Mean 0.126228
Standard dev 1.66013
Max value 3.16335
Min value -5.48823

EASTWARD WIND COMPT (M S-1)
No of obs 1797
Mean 12.5063
Standard dev 1.10150
Max value 15.6259
Min value 9.69569

VERTICAL WIND COMPT (M S-1)
No of obs 1797
Mean -0.246355
Standard dev 1.00455
Max value 1.51888
Min value -2.32043

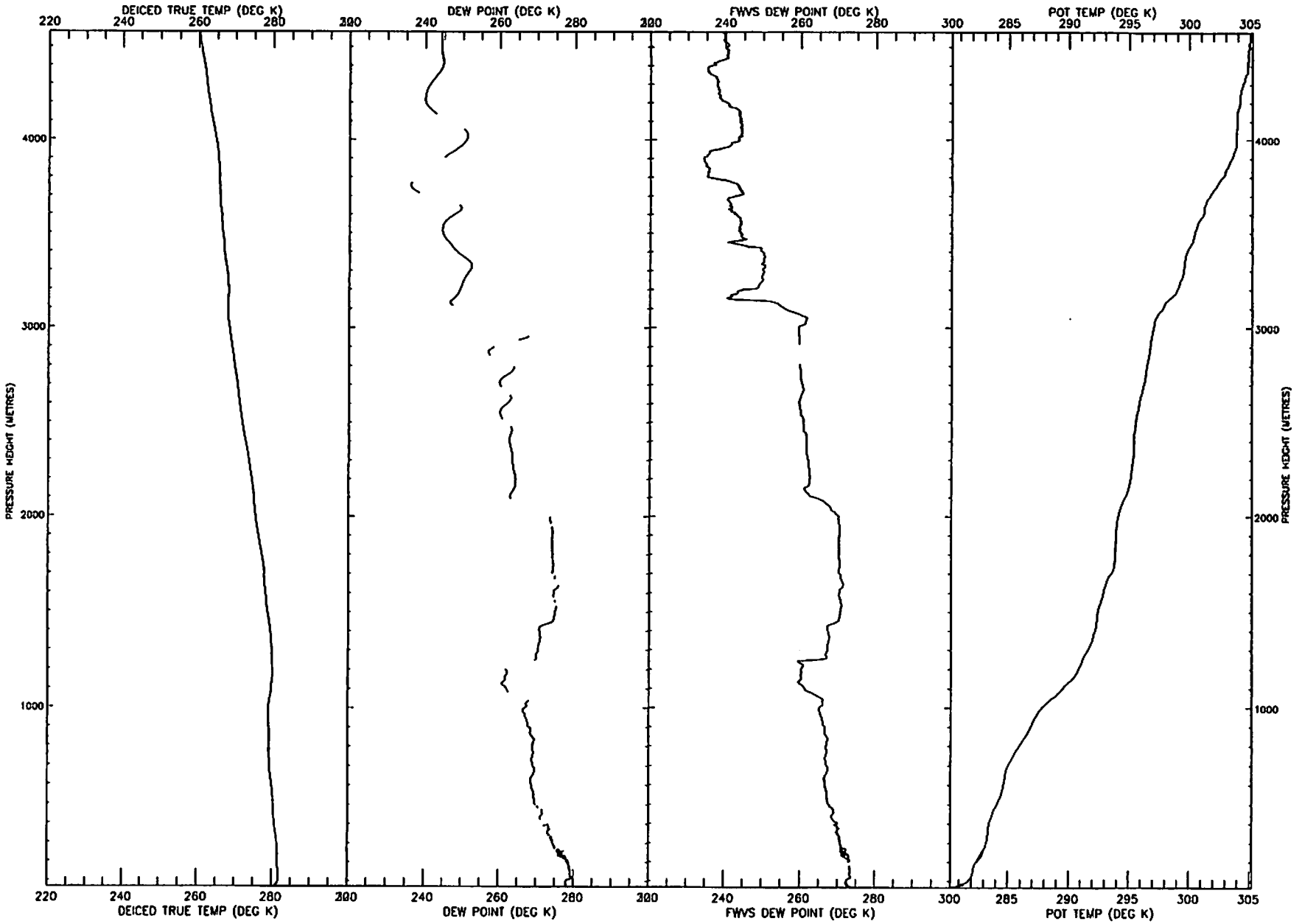
WIND SPEED (MS-1)
No of obs 1797
Mean 12.6183
Standard dev 1.08213
Max value 15.6290
Min value 9.94212

WIND DIRECTION (DEG)
Mean 269.422

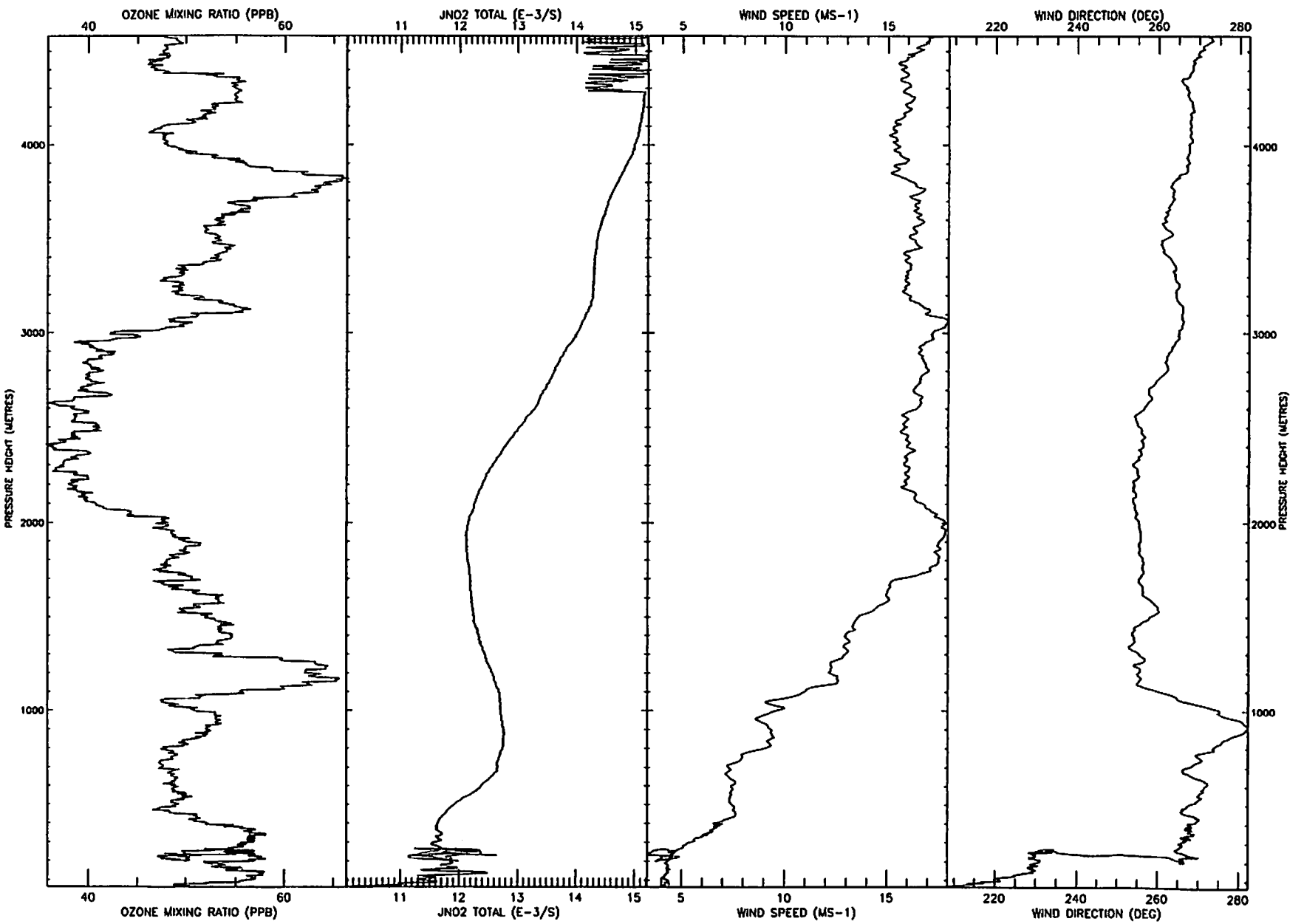
TRUE AIR SPEED (M S-1)
No of obs 1797
Mean 112.914
Standard dev 4.99913
Max value 118.723
Min value 99.8509

HEADING (DEG)
Mean 265.687

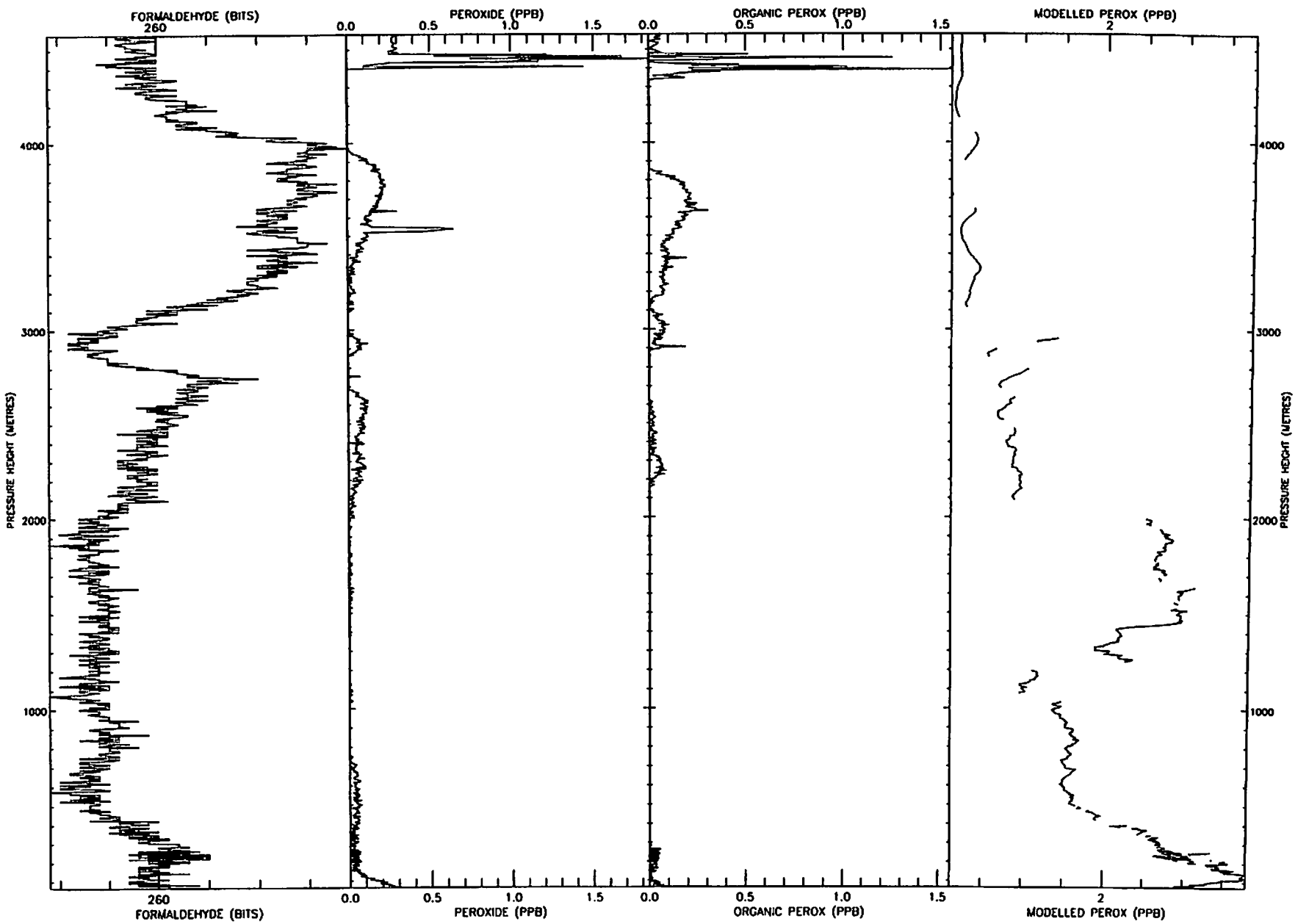
A531 02-APR-97 P3 FL150-500' From 135421-141058 *Plotted 18-Jun-1997 09:31*



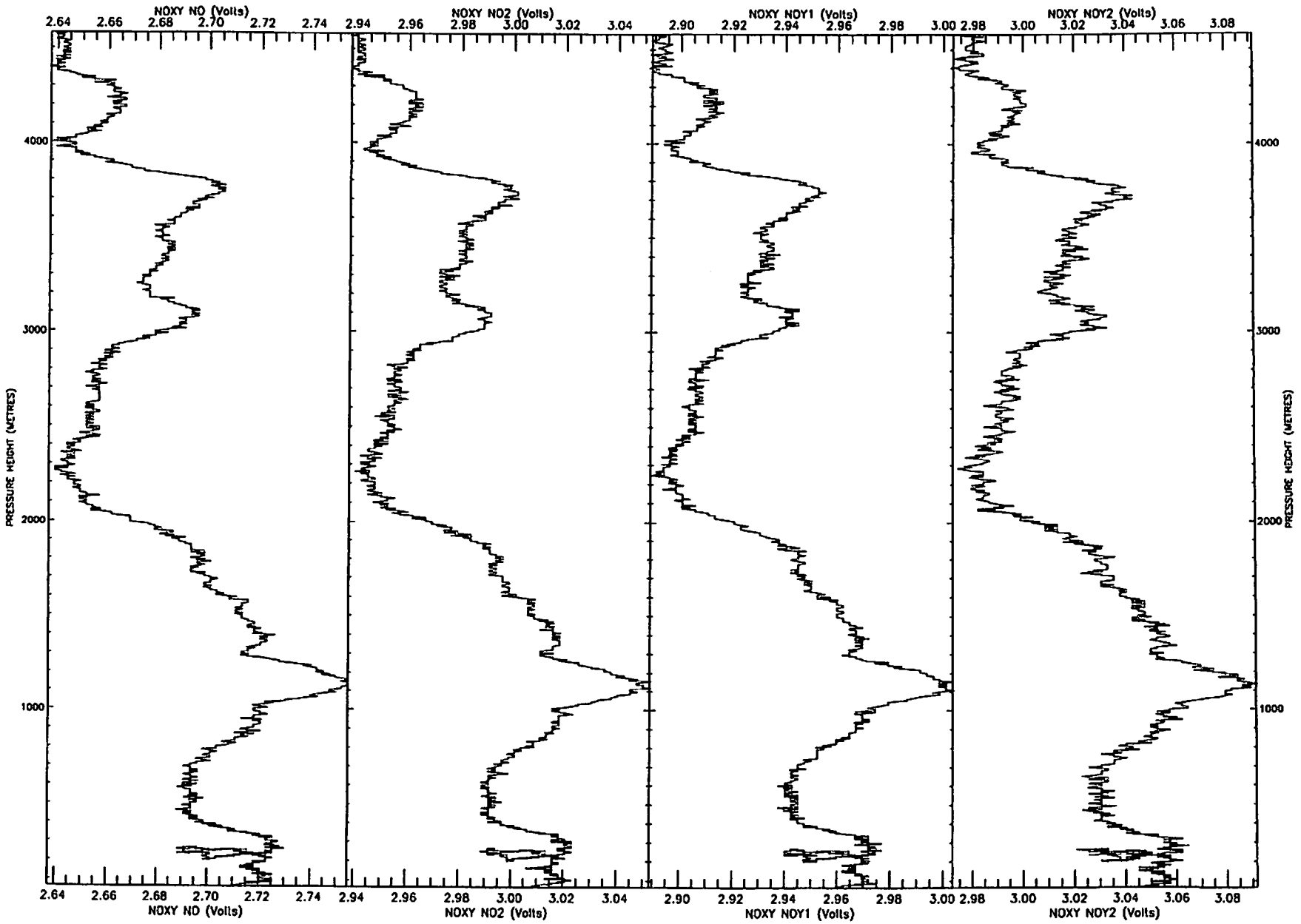
A531 02-APR-97 P3 FL150-500' From 135421-141058 *Plotted 18-Jun-1997 09:31*



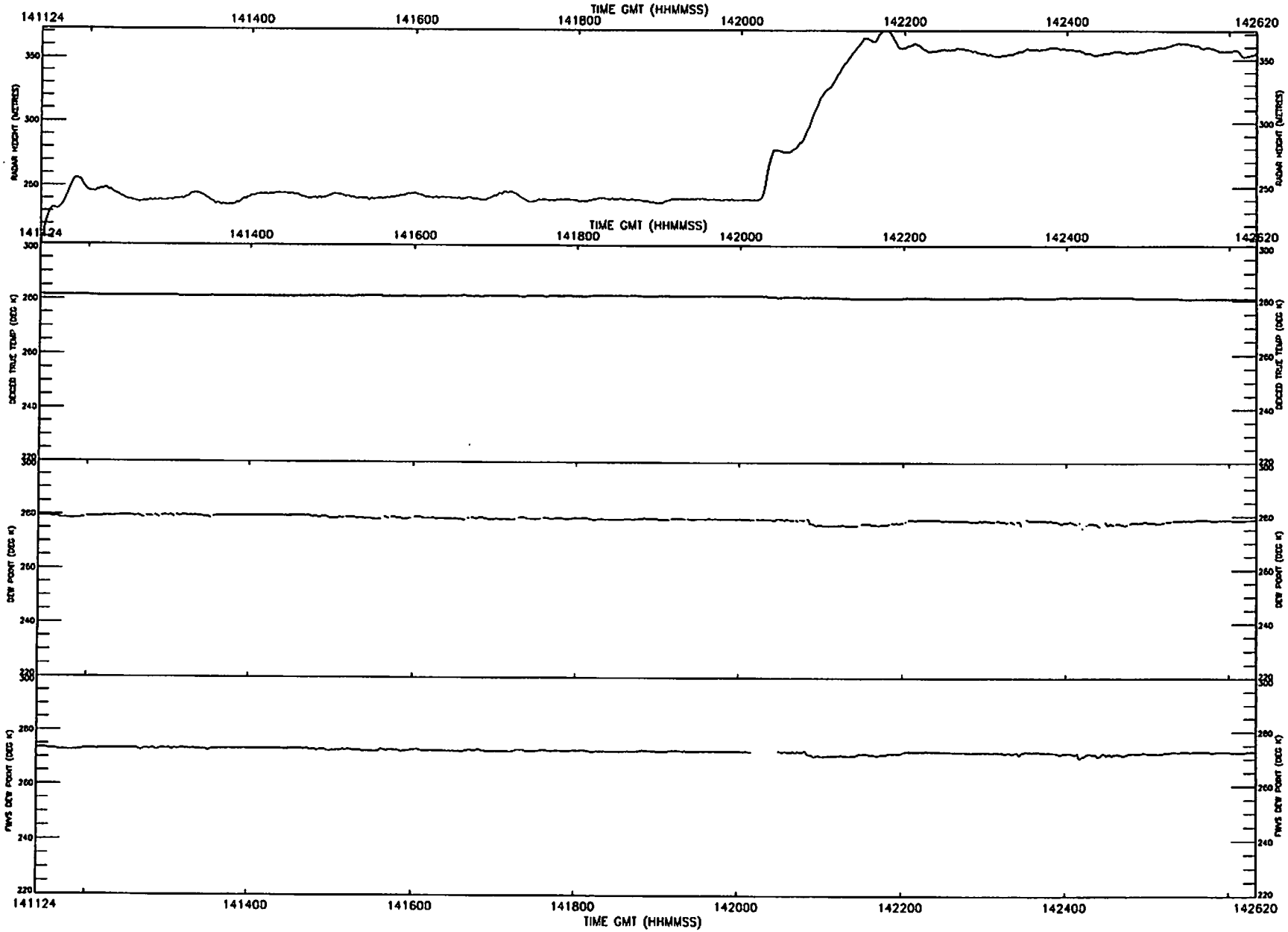
A531 02-APR-97 P3 FL150-500' From 135421-141058 *Plotted 9-Jun-1997 17:18*



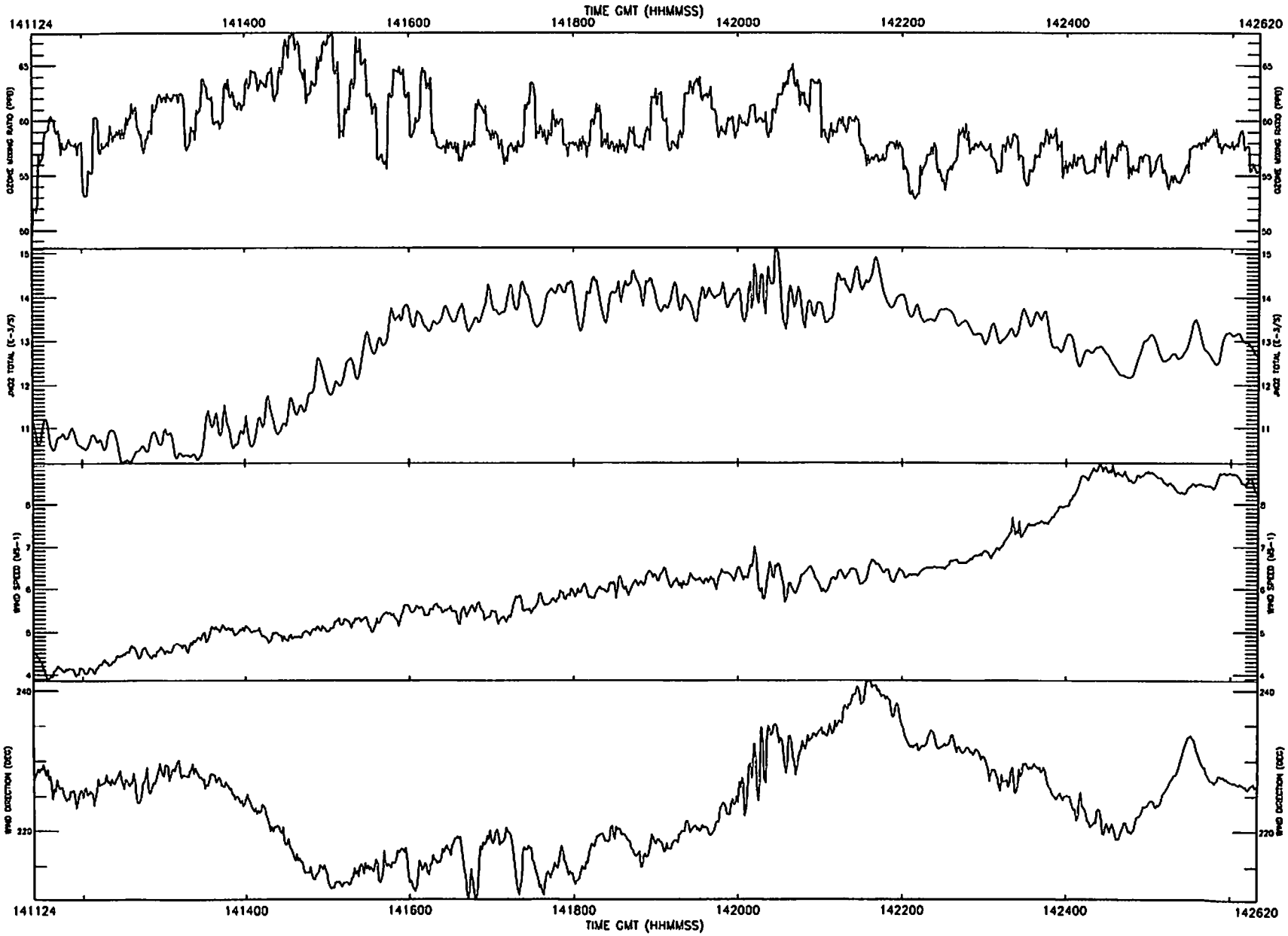
A531 02-APR-97 P3 FL150-500' From 135421-141058 *Plotted 9-Jun-1997 17:18*



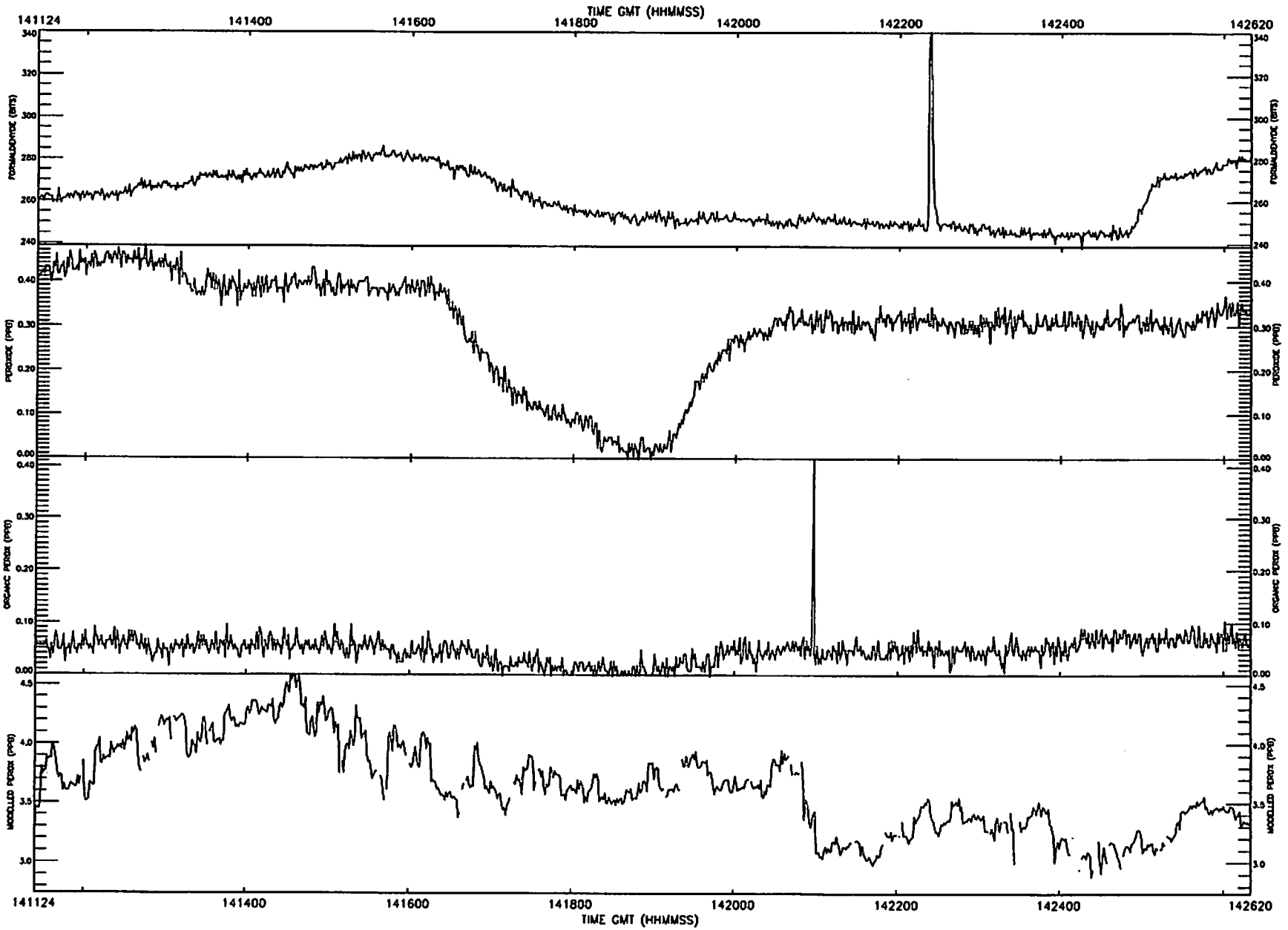
A531 02-APR-97 R4 800'-1100' From 141124-142620 *Plotted 18-Jun-1997 09:33*



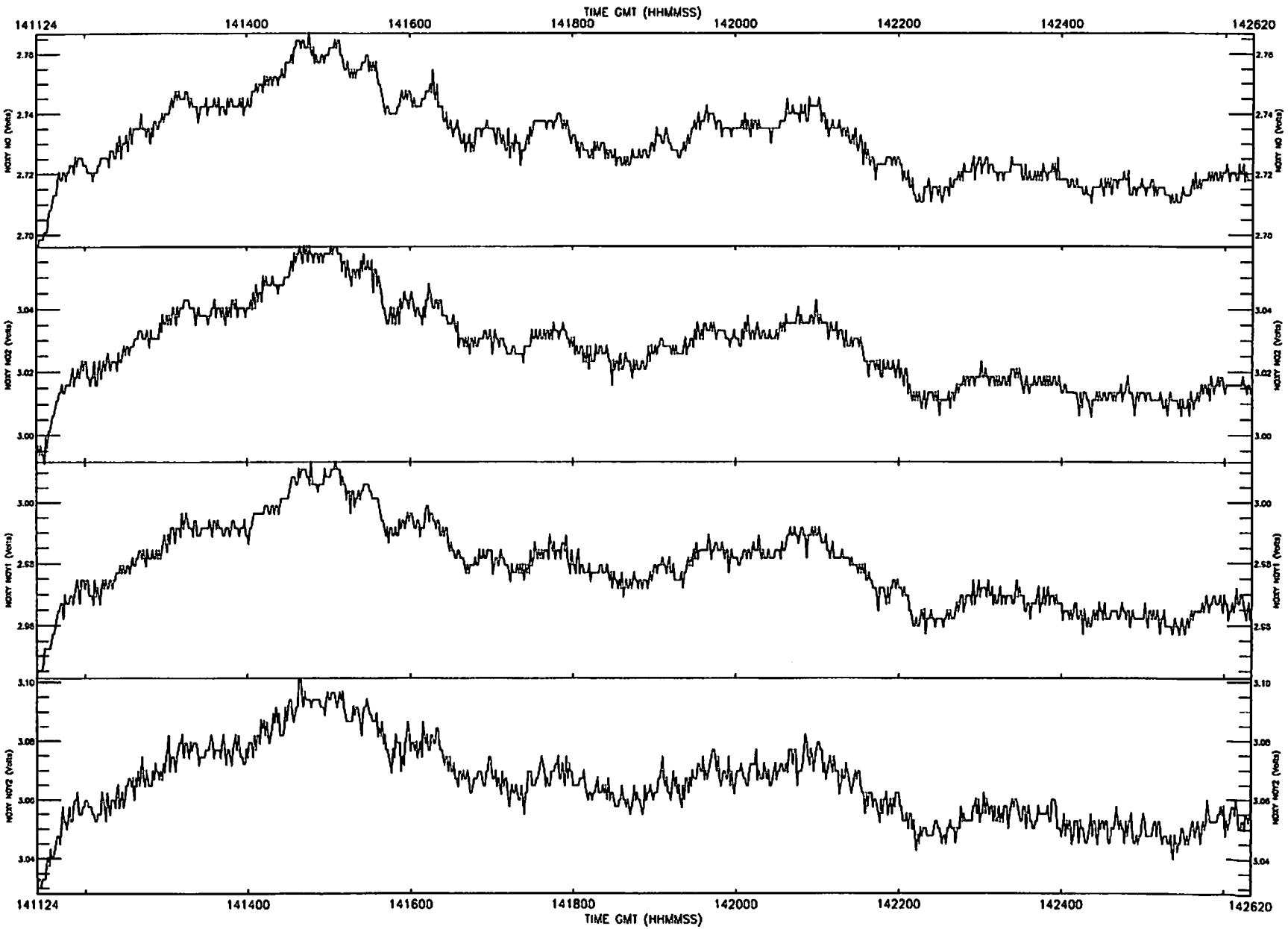
A531 02-APR-97 R4 800'-1100' From 141124-142620 *Plotted 18-Jun-1997 09:33*



A531 02-APR-97 R4 800'-1100' From 141124-142620 *Plotted 9-Jun-1997 17:21*



A531 02-APR-97 R4 800'-1100' From 141124-142620 *Plotted 9-Jun-1997 17:22*



A531 02-APR-97 R4 800'-1100' From 141124-142620 *Plotted 9-Jun-1997 17:22*

STATIC PRESSURE (MB)
No of obs 897
Mean 985.690
Standard dev 6.60530
Max value 995.250
Min value 975.335

DEICED TRUE TEMP (DEG K)
No of obs 897
Mean 281.257
Standard dev 0.267924
Max value 281.698
Min value 280.660

DEW POINT (DEG K)
No of obs 897
Mean 278.600
Standard dev 0.880164
Max value 279.969
Min value 275.495

OZONE MIXING RATIO (PPB)
No of obs 897
Mean 59.1751
Standard dev 3.01923
Max value 67.8876
Min value 48.3199

JNO2 TOTAL (E-3/S)
No of obs 897
Mean 13.1940
Standard dev 1.29562
Max value 15.4971
Min value 10.4464

PEROXIDE (PPB)
No of obs 897
Mean 0.300281
Standard dev 0.114149
Max value 0.480000
Min value 0.000000

RADAR HEIGHT (METRES)
No of obs 897
Mean 284.599
Standard dev 55.0546
Max value 372.281
Min value 204.085

CORRECTED LATITUDE (DEGREES)
No of obs 897
Mean 50.4748
Standard dev 0.224490
Max value 50.8663
Min value 50.0891

CORRECTED LONGITUDE (DEGREES)
No of obs 897
Mean -6.42651
Standard dev 2.180467e-02
Max value -6.38743
Min value -6.45894

NORTHWARD WIND COMPT (M S-1)
No of obs 897
Mean 4.36127
Standard dev 0.976943
Max value 6.83223
Min value 2.57868

EASTWARD WIND COMPT (M S-1)
No of obs 897
Mean 4.26295
Standard dev 1.15768
Max value 6.79234
Min value 2.68388

VERTICAL WIND COMPT (M S-1)
No of obs 897
Mean 6.439343e-02
Standard dev 0.300172
Max value 1.31425
Min value -0.771637

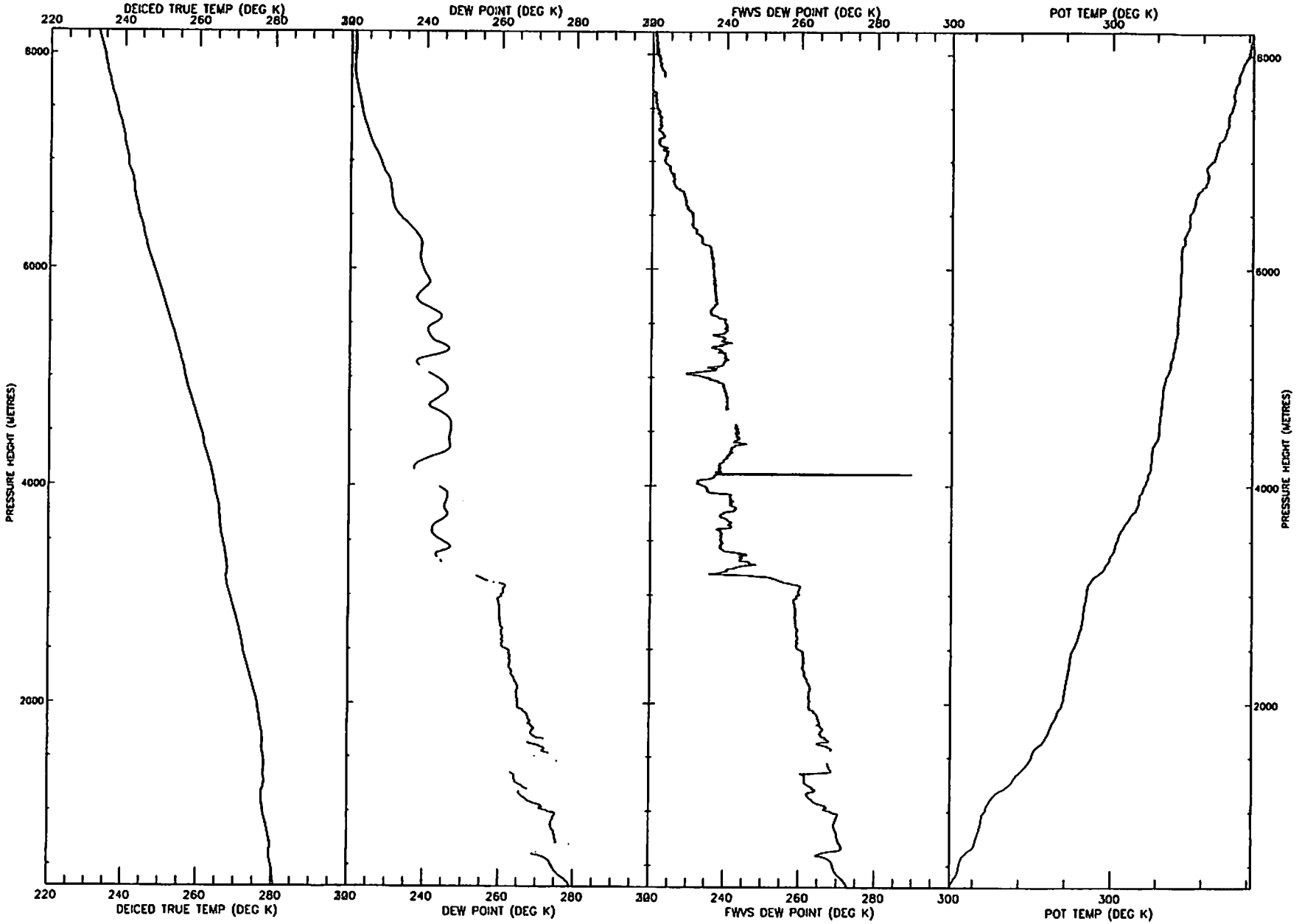
WIND SPEED (MS-1)
No of obs 897
Mean 6.14441
Standard dev 1.31665
Max value 8.95998
Min value 3.85527

WIND DIRECTION (DEG)
Mean 224.347

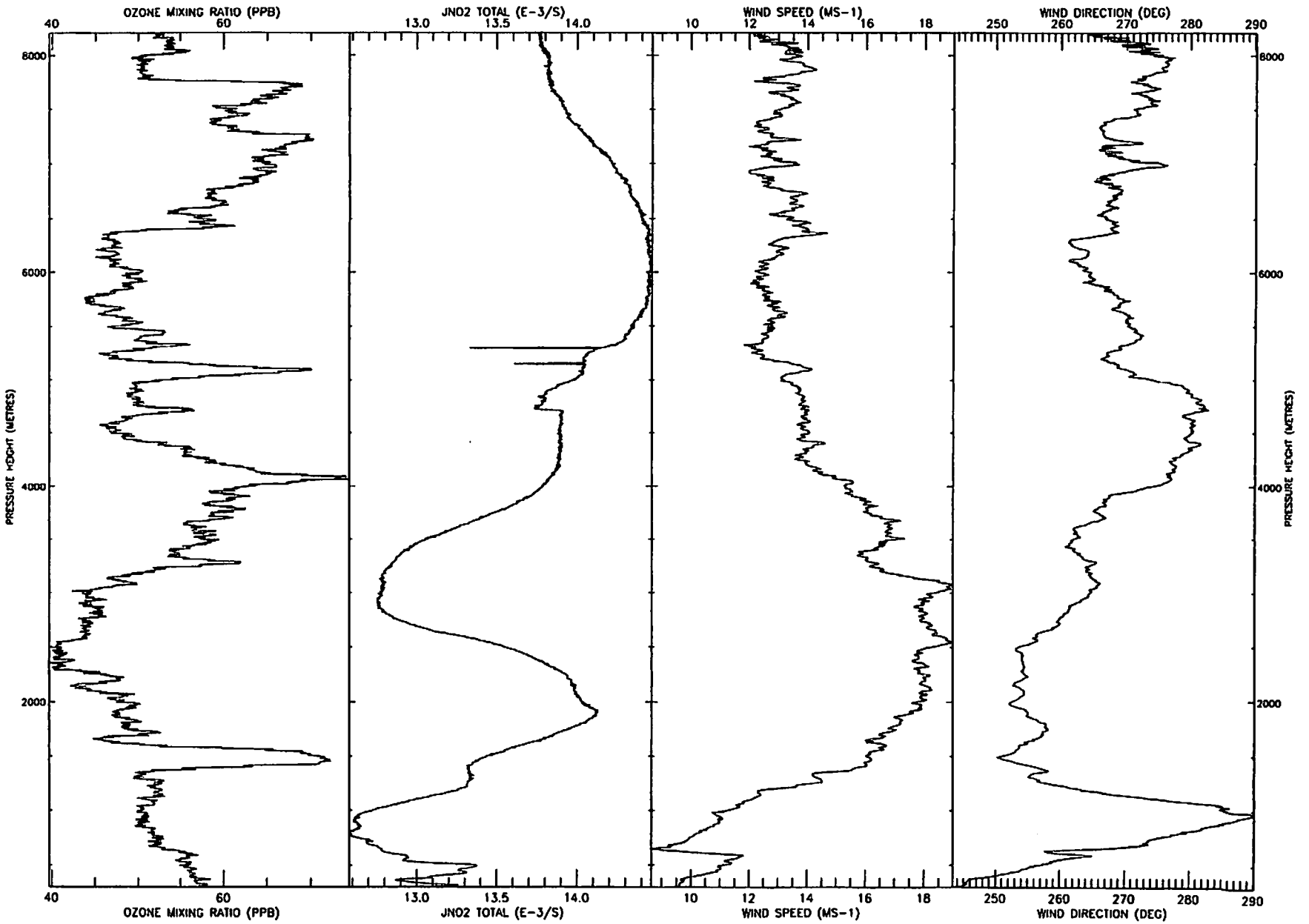
TRUE AIR SPEED (M S-1)
No of obs 897
Mean 92.4538
Standard dev 1.58954
Max value 96.1164
Min value 88.0273

HEADING (DEG)
Mean 356.650

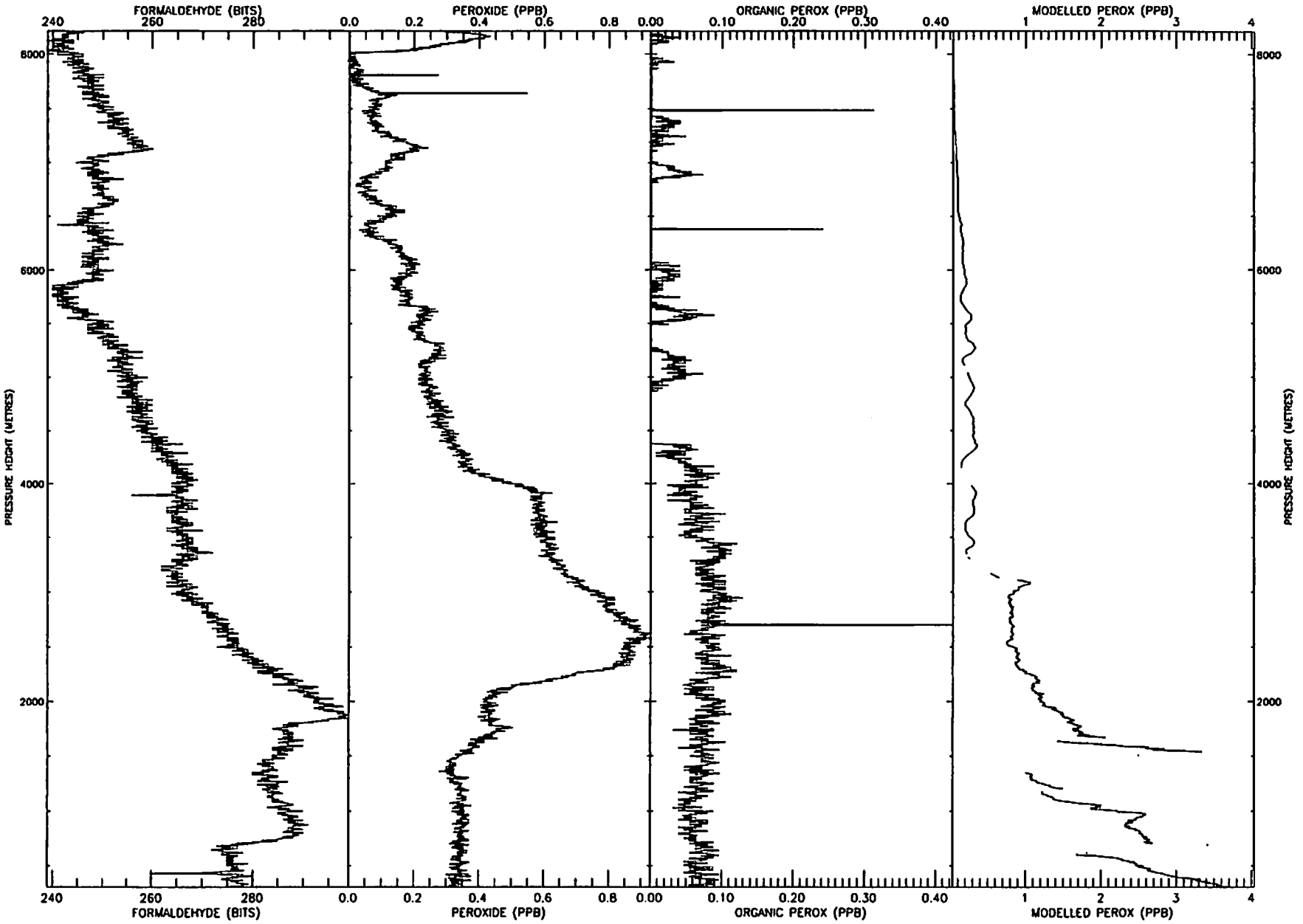
A531 02-APR-97 P4 1100'-FL270 From 142711-145338 *Plotted 18-Jun-1997 09:37*



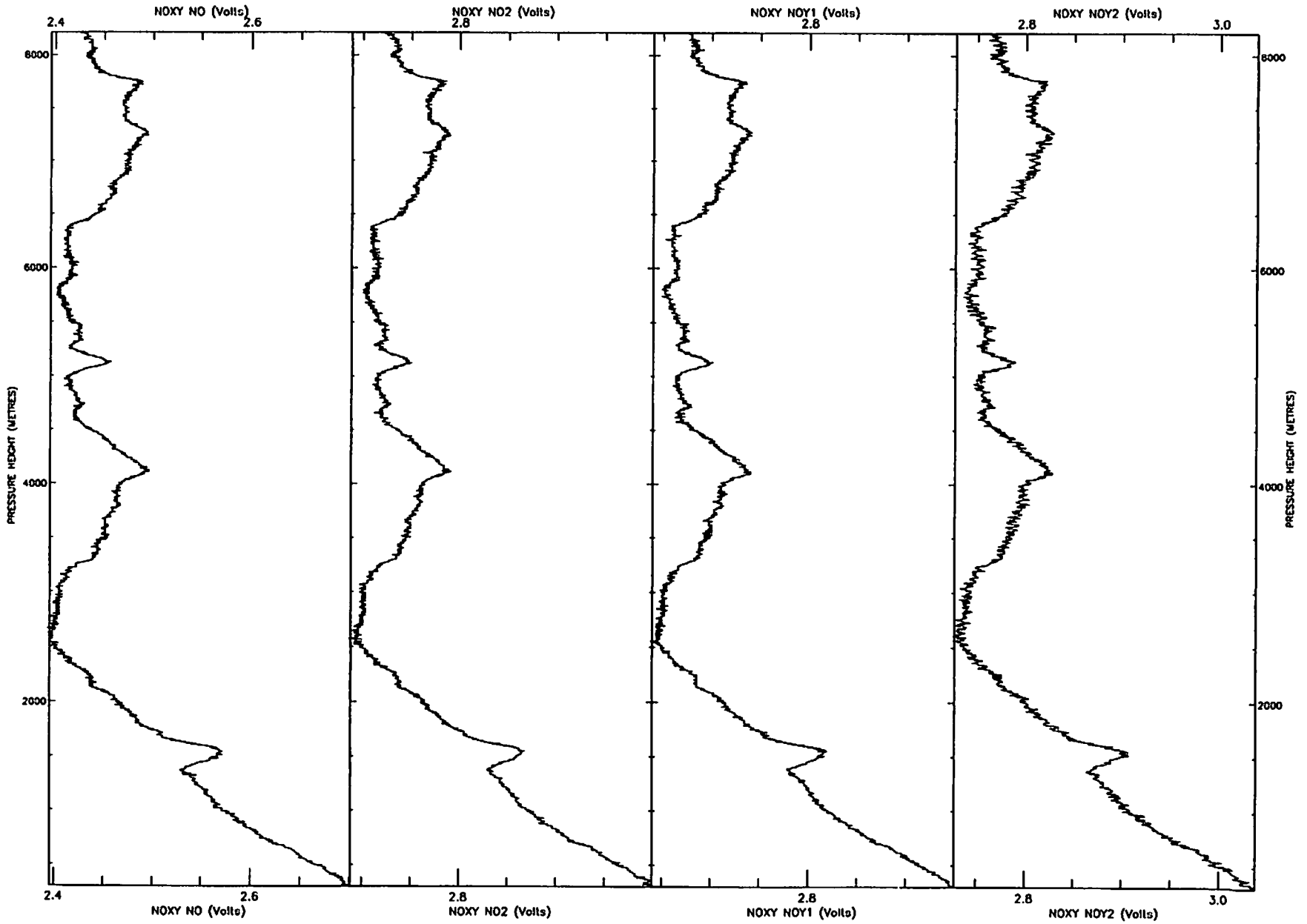
A531 02-APR-97 P4 1100'-FL270 From 142711-145338 *Plotted 18-Jun-1997 09:37*



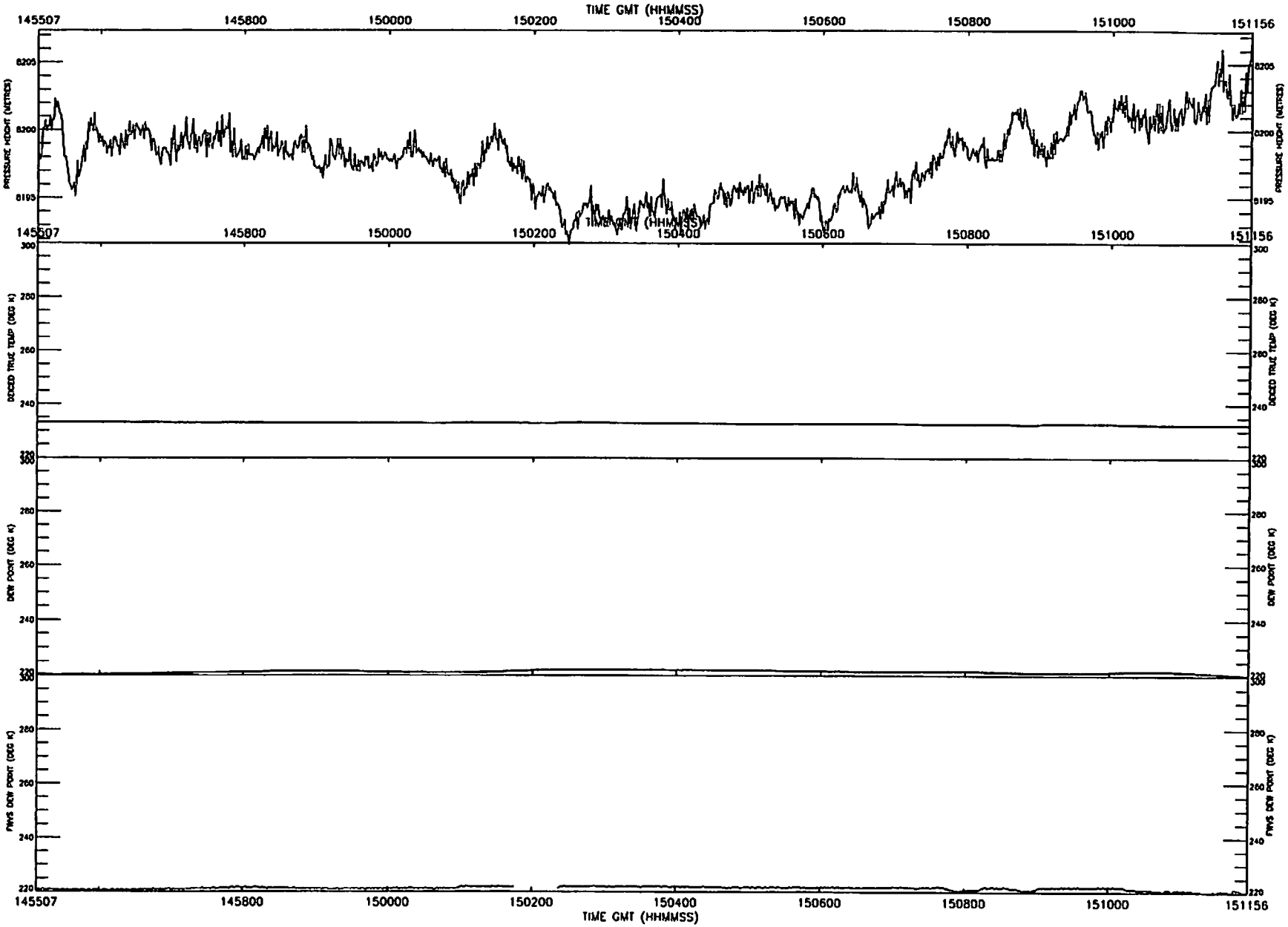
A531 02-APR-97 P4 1100'-FL270 From 142711-145338 *Plotted 9-Jun-1997 17:29*



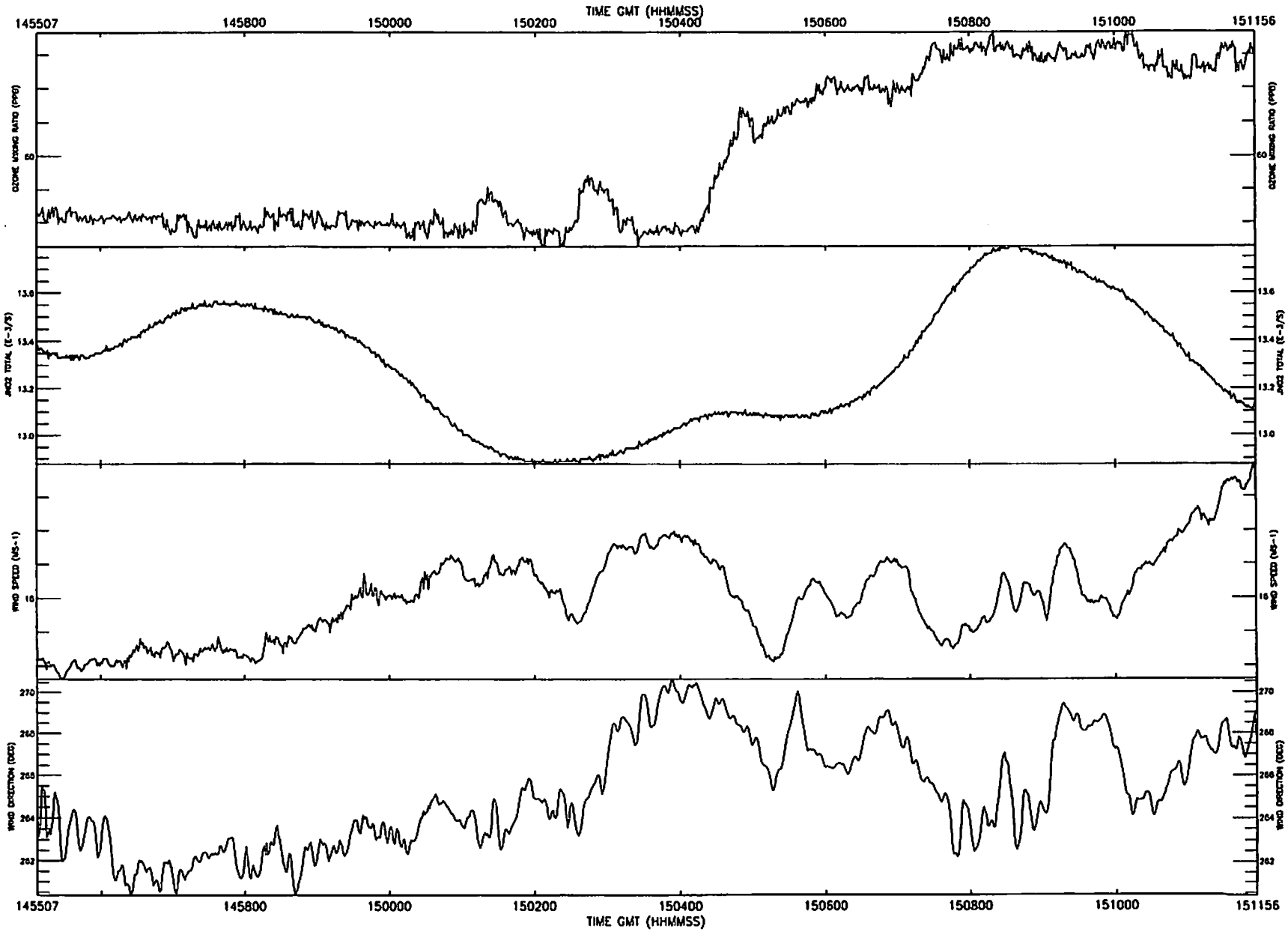
A531 02-APR-97 P4 1100'-FL270 From 142711-145338 *Plotted 9-Jun-1997 17:29*



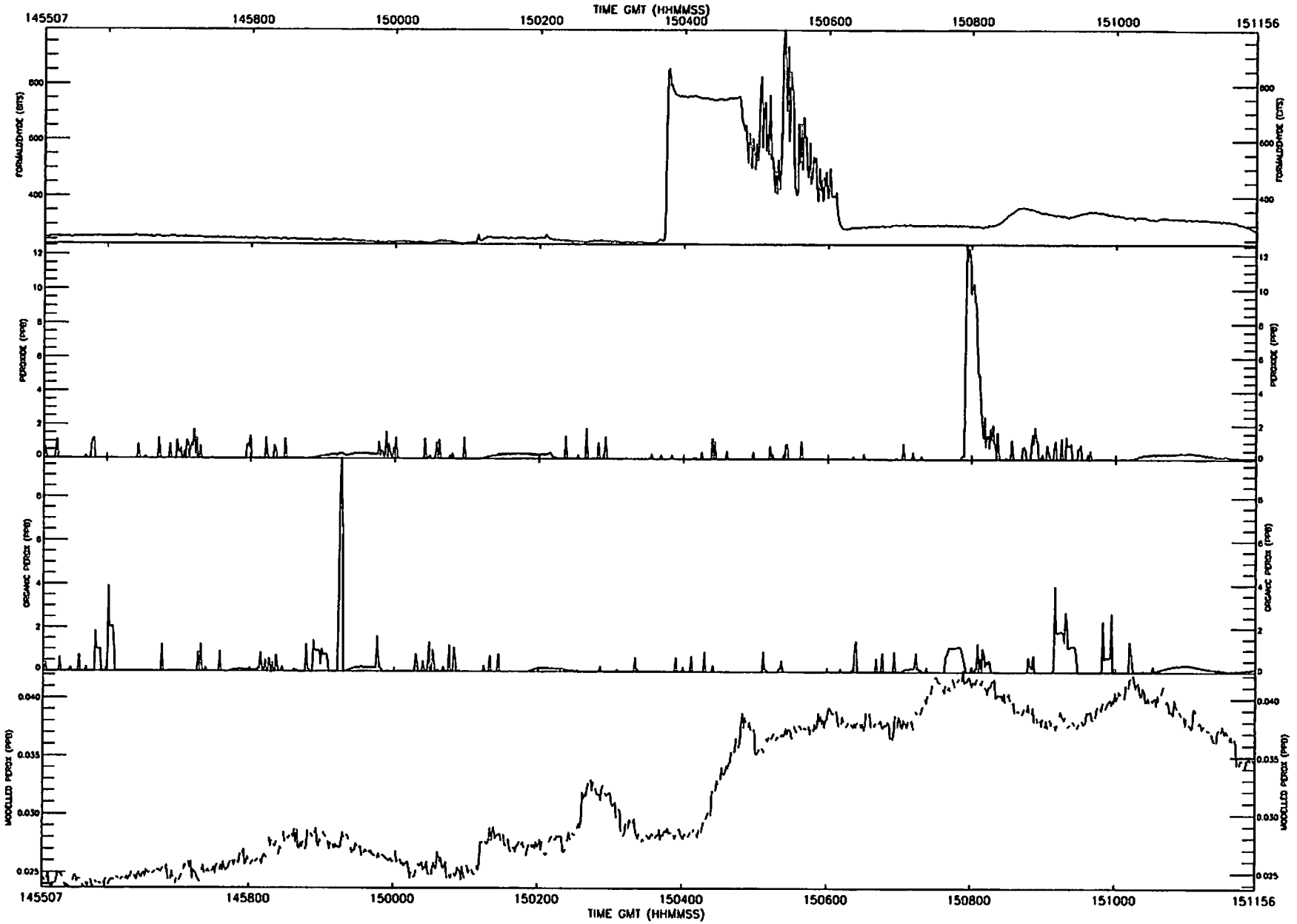
A531 02-APR-97 R5 FL270 From 145507-151156 *Plotted 18-Jun-1997 09:40*



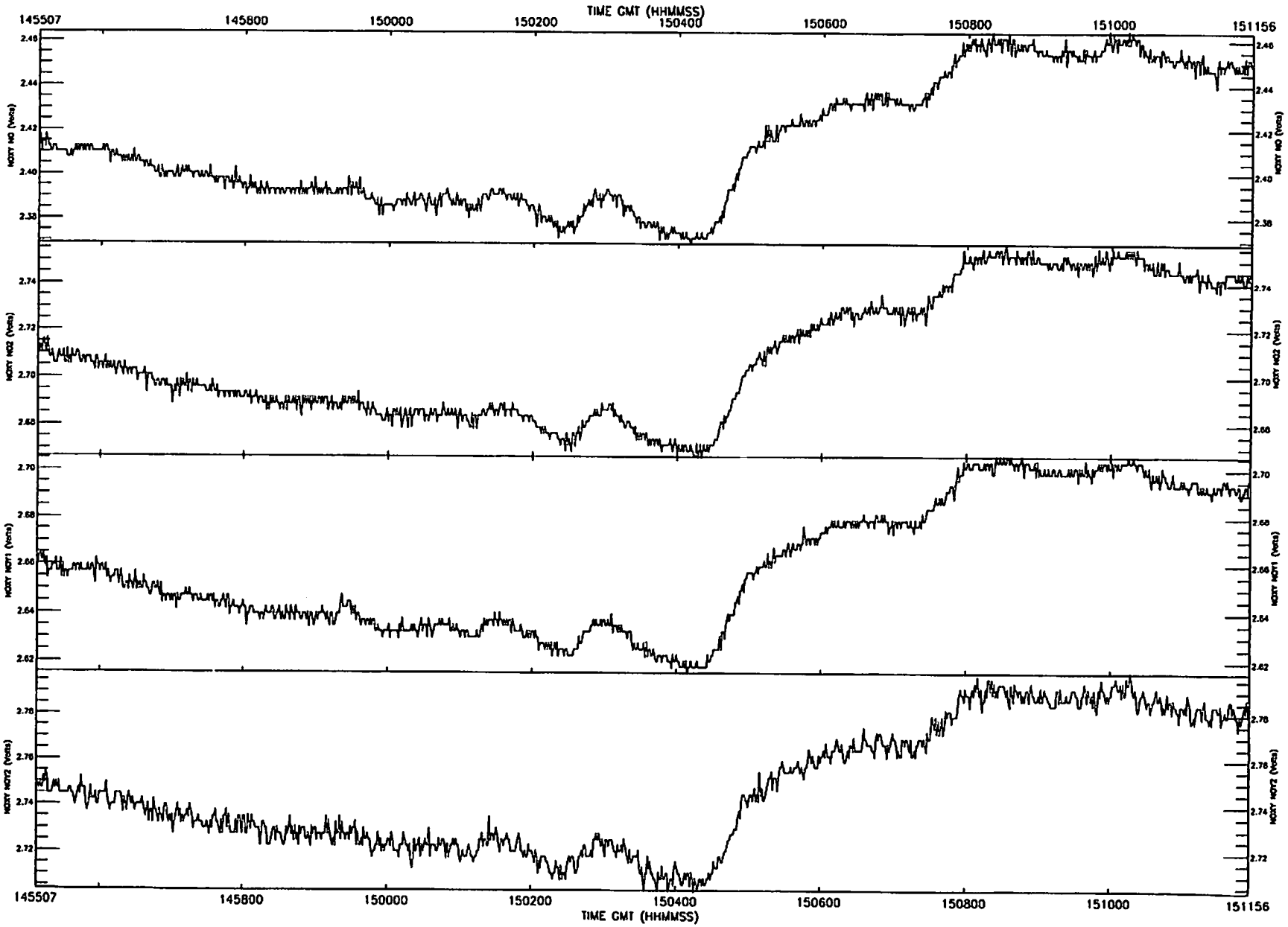
A531 02-APR-97 R5 FL270 From 145507-151156 *Plotted 18-Jun-1997 09:40*



A531 02-APR-97 R5 FL270 From 145507-151156 *Plotted 9-Jun-1997 17:34*



A531 02-APR-97 R5 FL270 From 145507-151156 *Plotted 9-Jun-1997 17:34*



A531 02-APR-97 R5 FL270 From 145507-151156 *Plotted 9-Jun-1997 17:34*

STATIC PRESSURE (MB)
No of obs 1010
Mean 345.926
Standard dev 0.137269
Max value 346.228
Min value 345.441

DEICED TRUE TEMP (DEG K)
No of obs 1010
Mean 232.770
Standard dev 0.243994
Max value 233.189
Min value 232.278

DEW POINT (DEG K)
No of obs 1010
Mean 221.323
Standard dev 0.493029
Max value 222.057
Min value 220.201

OZONE MIXING RATIO (PPB)
No of obs 1010
Mean 49.7718
Standard dev 24.7411
Max value 78.3880
Min value 1.000000e-38

JNO2 TOTAL (E-3/S)
No of obs 1010
Mean 12.5524
Standard dev 0.258113
Max value 13.0538
Min value 12.1387

PEROXIDE (PPB)
No of obs 1010
Mean 0.267216
Standard dev 1.12000
Max value 12.6080
Min value 0.000000

PRESSURE HEIGHT (METRES)
No of obs 1010
Mean 8197.72
Standard dev 2.72726
Max value 8207.37
Min value 8191.71

CORRECTED LATITUDE (DEGREES)
No of obs 1010
Mean 51.1098
Standard dev 0.148180
Max value 51.3624
Min value 50.8558

CORRECTED LONGITUDE (DEGREES)
No of obs 1010
Mean -4.78670
Standard dev 0.592917
Max value -3.76062
Min value -5.81874

NORTHWARD WIND COMPT (M S-1)
No of obs 1010
Mean 1.31196
Standard dev 0.687038
Max value 2.55527
Min value -0.189133

EASTWARD WIND COMPT (M S-1)
No of obs 1010
Mean 15.9365
Standard dev 0.705935
Max value 17.9817
Min value 14.6618

VERTICAL WIND COMPT (M S-1)
No of obs 1010
Mean -0.118000
Standard dev 0.407624
Max value 1.09011
Min value -0.875977

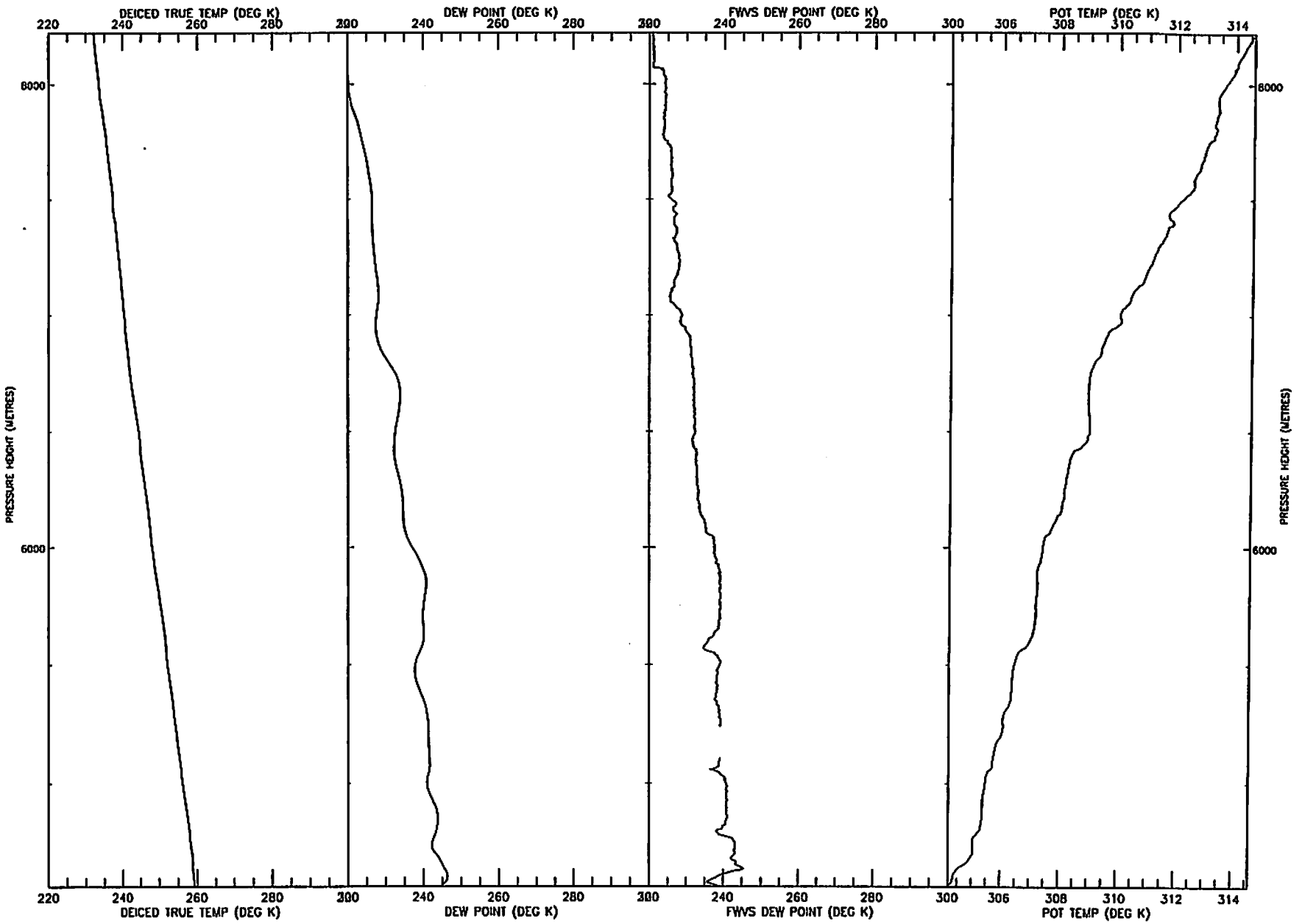
WIND SPEED (MS-1)
No of obs 1010
Mean 16.0058
Standard dev 0.668374
Max value 17.9853
Min value 14.8069

WIND DIRECTION (DEG)
Mean 265.294

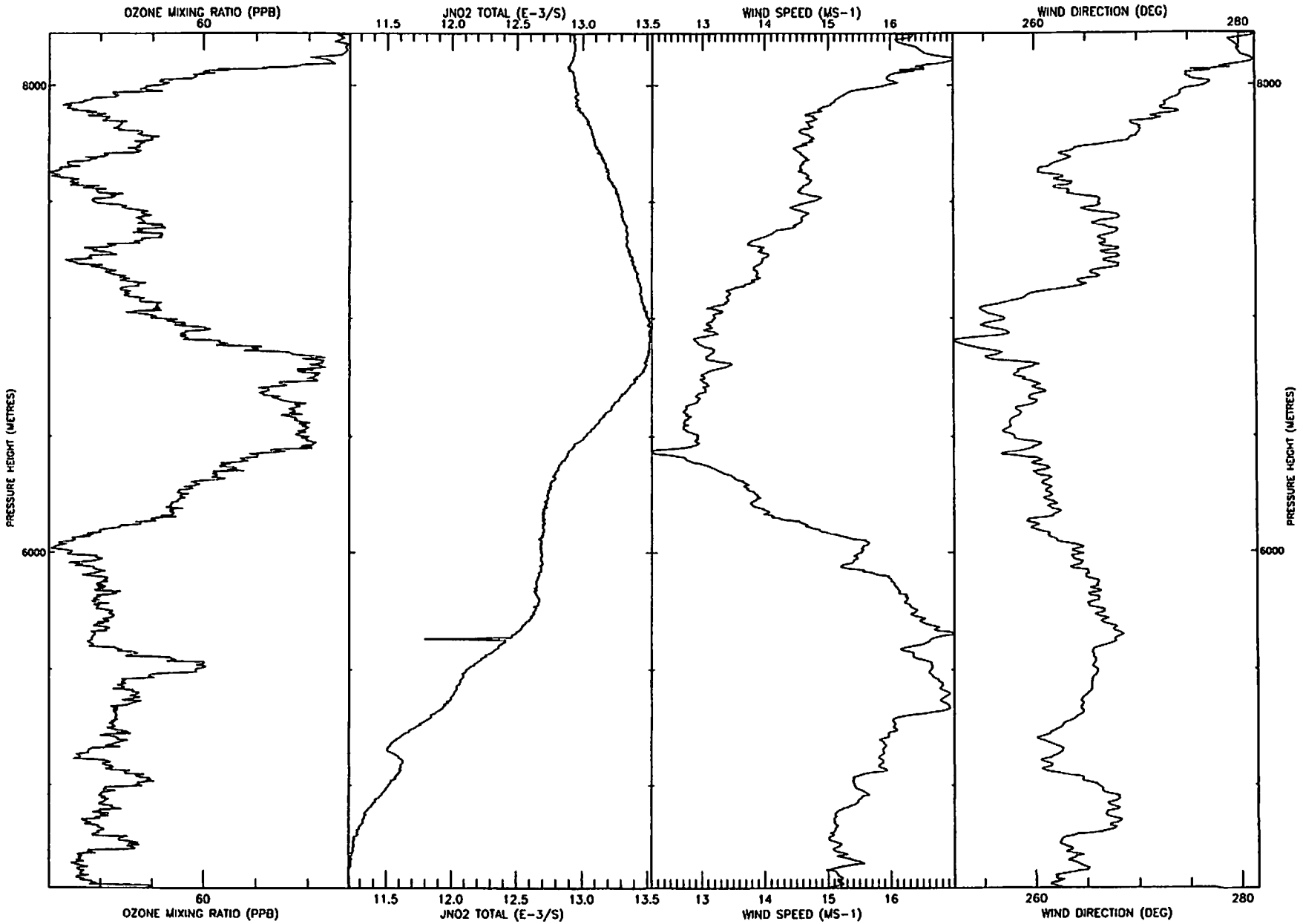
TRUE AIR SPEED (M S-1)
No of obs 1010
Mean 138.120
Standard dev 2.48962
Max value 142.116
Min value 133.477

HEADING (DEG)
Mean 68.6563

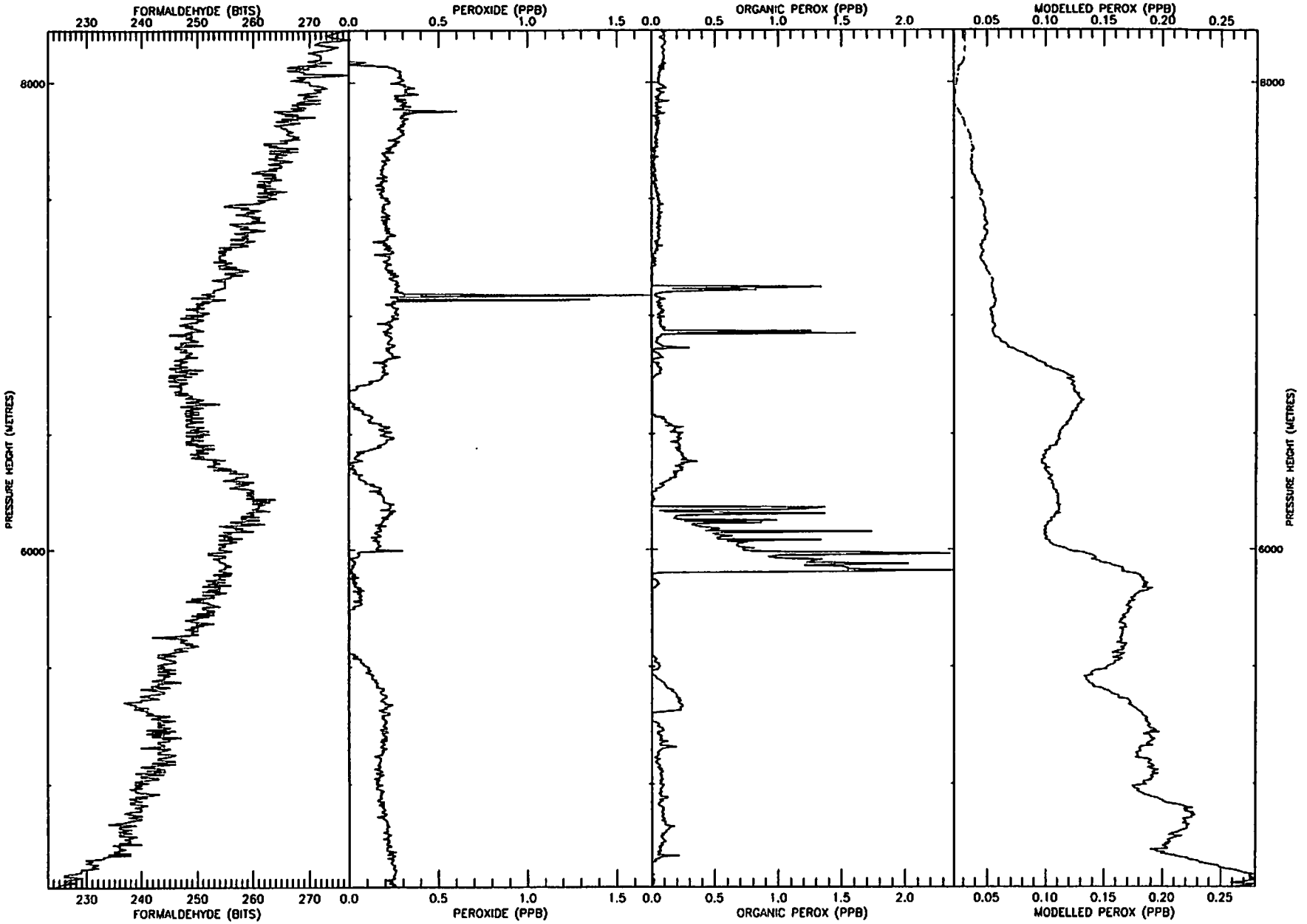
A531 02-APR-97 P5 FL270-FL150 From 151304-152507 *Plotted 18-Jun-1997 09:42*



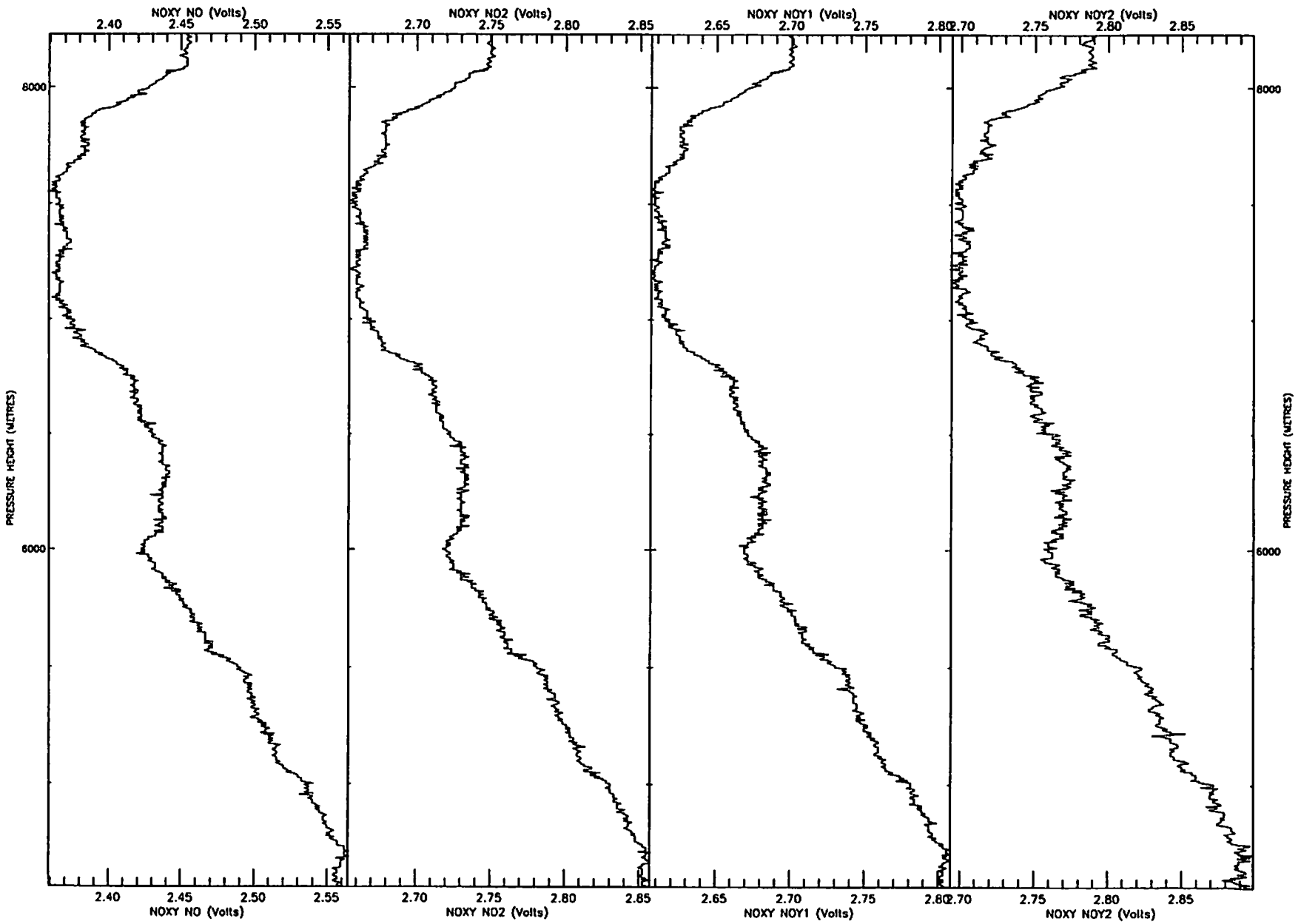
A531 02-APR-97 P5 FL270-FL150 From 151304-152507 *Plotted 18-Jun-1997 09:42*



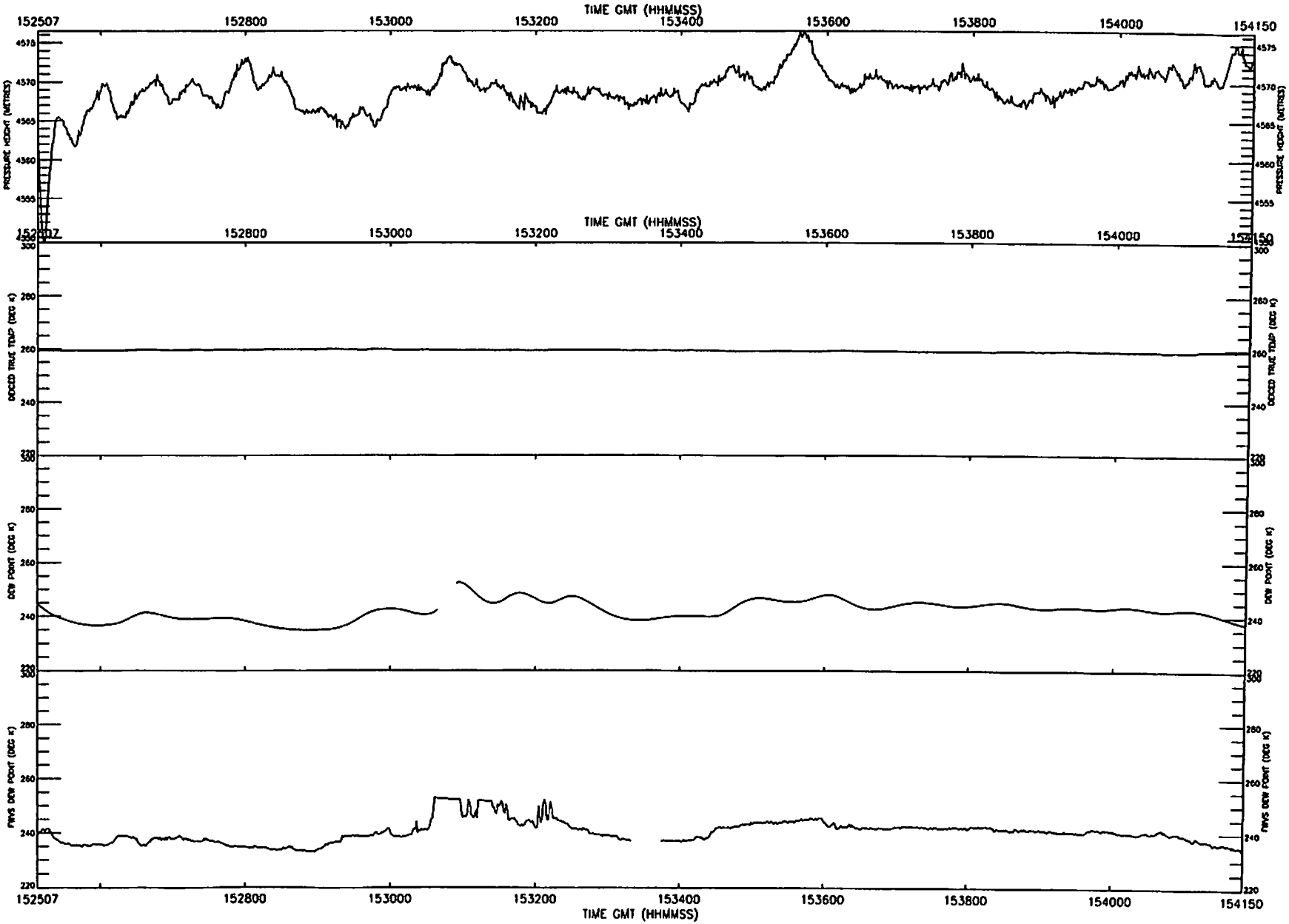
A531 02-APR-97 P5 FL270-FL150 From 151304-152507 *Plotted 9-Jun-1997 17:37*



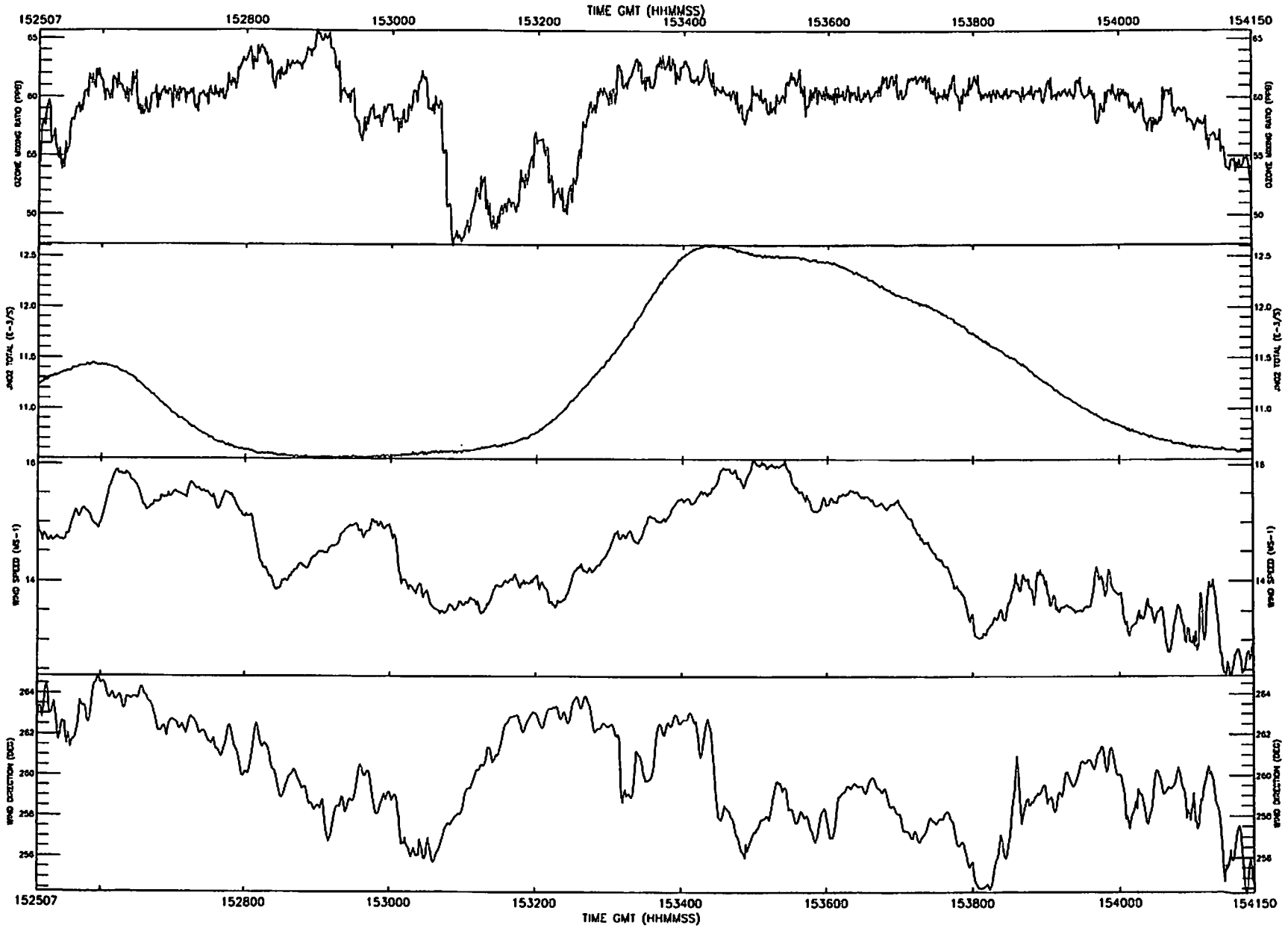
A531 02-APR-97 P5 FL270-FL150 From 151304-152507 *Plotted 9-Jun-1997 17:37*



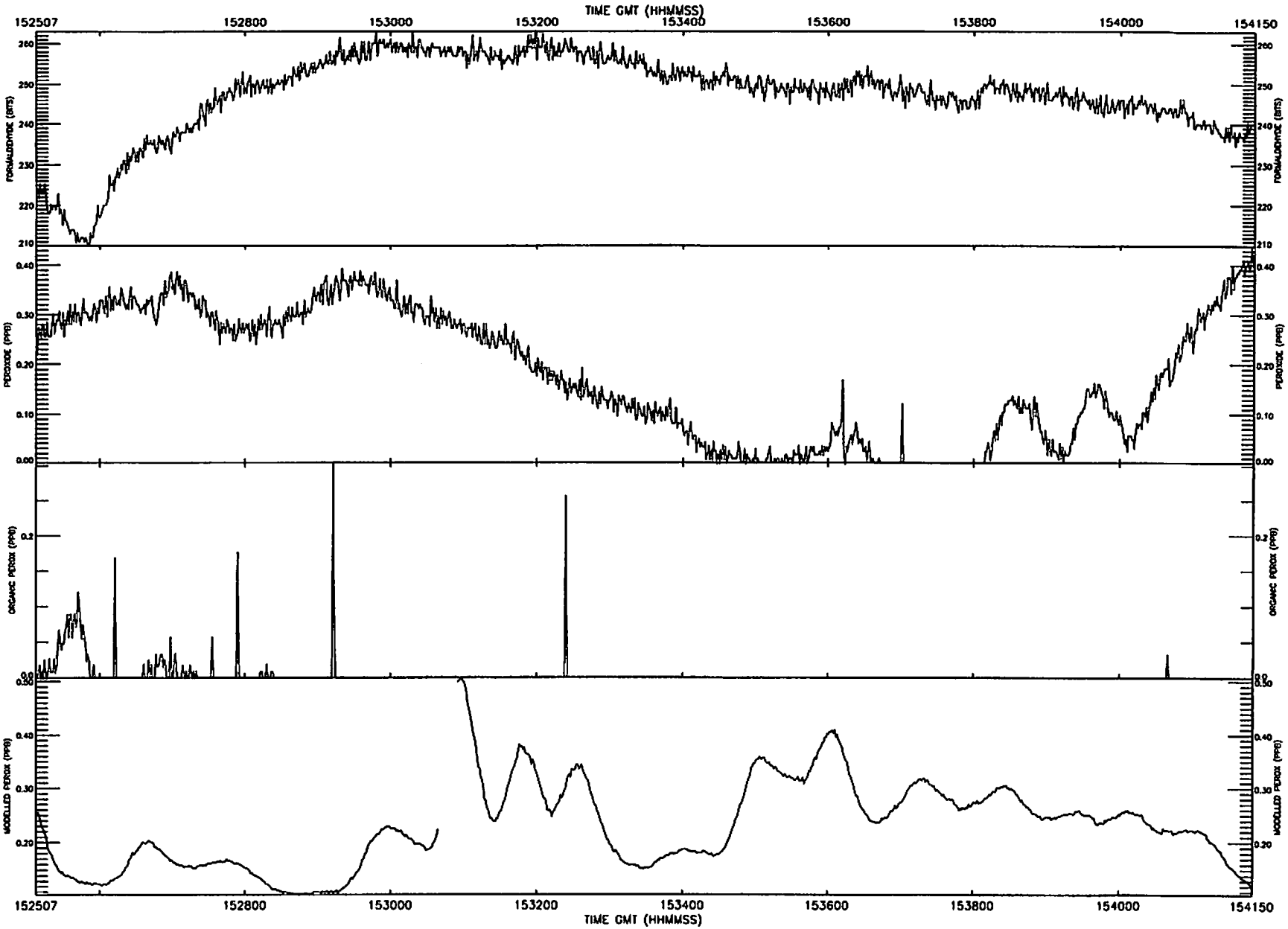
A531 02-APR-97 R6 FL150 From 152507-154150 *Plotted 18-Jun-1997 09:44*



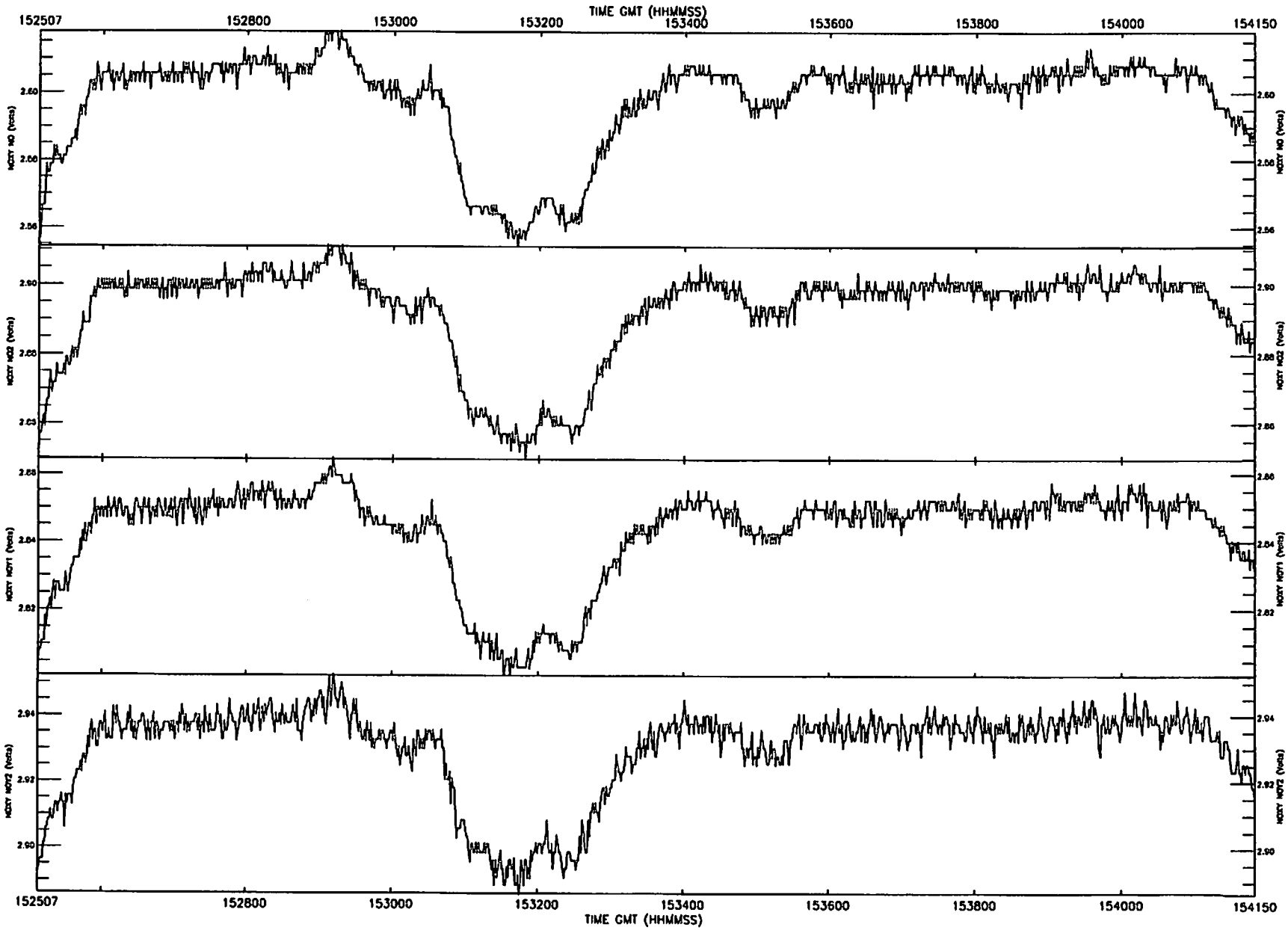
A531 02-APR-97 R6 FL150 From 152507-154150 *Plotted 18-Jun-1997 09:45*



A531 02-APR-97 R6 FL150 From 152507-154150 *Plotted 9-Jun-1997 17:41*



A531 02-APR-97 R6 FL150 From 152507-154150 *Plotted 9-Jun-1997 17:41*



A531 02-APR-97 R6 FL150 From 152507-154150 *Plotted 9-Jun-1997 17:41*

STATIC PRESSURE (MB)
No of obs 1004
Mean 572.043
Standard dev 0.209547
Max value 573.527
Min value 571.472

DEICED TRUE TEMP (DEG K)
No of obs 1004
Mean 259.415
Standard dev 0.228950
Max value 259.856
Min value 258.897

DEW POINT (DEG K)
No of obs 1004
Mean 242.152
Standard dev 3.64481
Max value 252.590
Min value 234.823

OZONE MIXING RATIO (PPB)
No of obs 1004
Mean 59.2202
Standard dev 3.36069
Max value 65.7020
Min value 47.5062

JNO2 TOTAL (E-3/S)
No of obs 1004
Mean 11.3866
Standard dev 0.734041
Max value 12.7376
Min value 10.5963

PEROXIDE (PPB)
No of obs 1004
Mean 0.179490
Standard dev 0.130757
Max value 0.440000
Min value 0.000000

PRESSURE HEIGHT (METRES)
No of obs 1004
Mean 4568.97
Standard dev 2.77055
Max value 4576.52
Min value 4549.37

CORRECTED LATITUDE (DEGREES)
No of obs 1004
Mean 51.0925
Standard dev 6.440071e-04
Max value 51.0936
Min value 51.0913

CORRECTED LONGITUDE (DEGREES)
No of obs 1004
Mean -3.36029
Standard dev 0.534656
Max value -2.44123
Min value -4.28961

NORTHWARD WIND COMPT (M S-1)
No of obs 1004
Mean 2.54426
Standard dev 0.573276
Max value 3.81271
Min value 1.32817

EASTWARD WIND COMPT (M S-1)
No of obs 1004
Mean 14.2769
Standard dev 0.915442
Max value 15.8194
Min value 12.0314

VERTICAL WIND COMPT (M S-1)
No of obs 1004
Mean 0.404352
Standard dev 0.773834
Max value 2.81282
Min value -0.478699

WIND SPEED (MS-1)
No of obs 1004
Mean 14.5148
Standard dev 0.889102
Max value 16.0956
Min value 12.3996

WIND DIRECTION (DEG)
Mean 259.896

TRUE AIR SPEED (M S-1)
No of obs 1004
Mean 114.720
Standard dev 1.43256
Max value 118.152
Min value 111.825

HEADING (DEG)
Mean 90.0185

Glossary

Aircraft Position, Speed and Attitude

- **Navigation:** The aircraft carries GPS, OMEGA, and inertial navigation systems.
- **Pressure height:** is based on the standard atmosphere as specified by the International Civil Aviation Organisation (sea level pressure of 1013.25 hPa). Pressure height is quoted in terms of Flight Levels (height in hundreds of feet *e.g.* FL100 = 10000 feet).
- **Radar height:** altitude of the aircraft above surface, measured by radar.
- **Time:** All times are UTC.

General meteorology

- **Tephigrams:** are given for every major profile of each flight. A tephigram is a thermodynamic diagram (temperature (T) - entropy (ϕ) diagram) used to assess the static stability of a given atmospheric profile. Other meteorological organisations use similar diagrams such as the Emagram or the Skew T log p diagram.
- **Deiced true temperature:** air temperature with corrections for aircraft speed and altitude.
- **Potential temperature:** the temperature that a parcel of air would have if it follows a dry adiabatic lapse rate to the 1000 hPa level.
- **Dew point:** dew point (the temperature at which a sample of air would just become saturated with respect to a plane surface of water if cooled at a constant pressure) calculated from the chilled mirror General Eastern hygrometer.
- **FWVS Dew point:** dew point calculated by use of the Lyman-α spectroscopic instrument "the fluorescence water vapour sensor".

Cloud Physics

- **PCASP:** The Passive Cavity Aerosol Sampling Probe counts number concentrations (number per cm^3) of particles in 15 channels spaced pseudo-logarithmically over the diameter range 0.10 μm to 3.00 μm, to provide a particle size distribution over this range.
- **FSSP:** The Forward Scattering Spectrometer Probe is used to measure water droplets in the size range 0.5 to 47.0 μm diameter (cloud droplets). It has four range settings, each of which is divided into 15 size channels.

Chemistry Parameters

- **Ozone:** Calibrated readings from the TECO 49 ozone analyser in ppb. Instrument scientist: Joss Kent (UK Met. Office).

- **JNO_2:** The sum of upward and downward facing radiometers (raw data). Instrument scientists: Christoph Gerbig and Sandra Schmitgen (FZ Jülich).

- **Hydrogen peroxide:** Raw data recorded in ppb (approx.). Instrument scientist: Brian Bandy (UEA Norwich).

- **Organic peroxide:** Raw data recorded in ppb (approx.). Instrument scientist: Brian Bandy (UEA Norwich).

- **Modelled peroxide:** hydrogen peroxide concentrations as estimated from the concentrations of ozone and water vapour concentrations according to the following algorithm. The model is used in flight and is included in this data summary for individual scientists assessment of the use of algorithms for the purpose of in flight planning. Contact Brian Bandy, Claire Reeves (UEA, Norwich) or Dave Tiddeman (UK Met. Office) for details.

$$H_2O_2 = (k_3 j_4 [O_3][H_2O])/(k_5[M](j_6+k_7+[OH]k_8)$$

where k_3 is the rate coefficient for the reaction: $O(^1D) + H_2O \rightarrow 2OH$
k_5 is the rate coefficient for the reaction: $O(^1D) + M \rightarrow O(^3P) + M$
k_8 is the rate coefficient for the reaction: $OH + H_2O_2 \rightarrow H_2O + HO_2$
k_7 is the first order loss due to dry deposition. However, as the boundary layer is difficult to define, this term has been ignored for the time being.
j_4 is the rate coefficient for the reaction:$O_3 + h\nu \rightarrow O(^1D) + O_2$
j_6 is the rate coefficient for reaction: $H_2O_2 + h\nu \rightarrow OH + OH$
j_4, j_6 and [OH], calculated by a 2D model, are dependent upon latitude and time of year.

- **Formaldehyde:** Raw data recorded as bits. NB this instrument has a long time delay *ca.* 12 minutes. Instrument scientist: Graham Mills (UEA, Norwich).

- **NOxy:** Parameters (NO, NO_2, NO_{y1}, NO_{y2}) were recorded on MRF's data recording system and are plotted in volts. Instrument scientist: Stephane Bauguitte (UEA, Norwich).

- **Bottles:** Please refer to the bottle flight logs (within the flight folder section to see when these were filled). Bottle filler: David Tiddeman (UK Met. Office).

- **Bags/CO analysis:** Please refer to the bottle flight logs (within the flight folder section to see when these were filled). Bottle filler: David Tiddeman (UK Met. Office). Analysis was carried out at ITE Edinburgh by Neil Cape. Plots of CO (ppb) with altitude (pressure height in metres)are included. Contamination has been noted in some of the bag samples, for further advice contact ITE Edinburgh.

Natural Environment Research Council

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